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FROM
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THE

Manualo

The Player Piano that is all but human

CARE
REGULATION
REPAIR

The Baldwin Piano Company

FACTORIES:

CINCINNATI — CHICAGO

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HOW TO FIND THE ANSWER TO YOUR NEEDS

TO find the answer to any question regarding the Care, the Regulation or the Repair of a Manualo, read the pages of this book relating to *that part* of the instrument you are working at. Also study the drawings opposite these particular pages. The different parts of the Manualo are grouped together and illustrated on the opposite pages, so you will have no trouble in locating anything you may wish to inform yourself on, without going through a complicated index.

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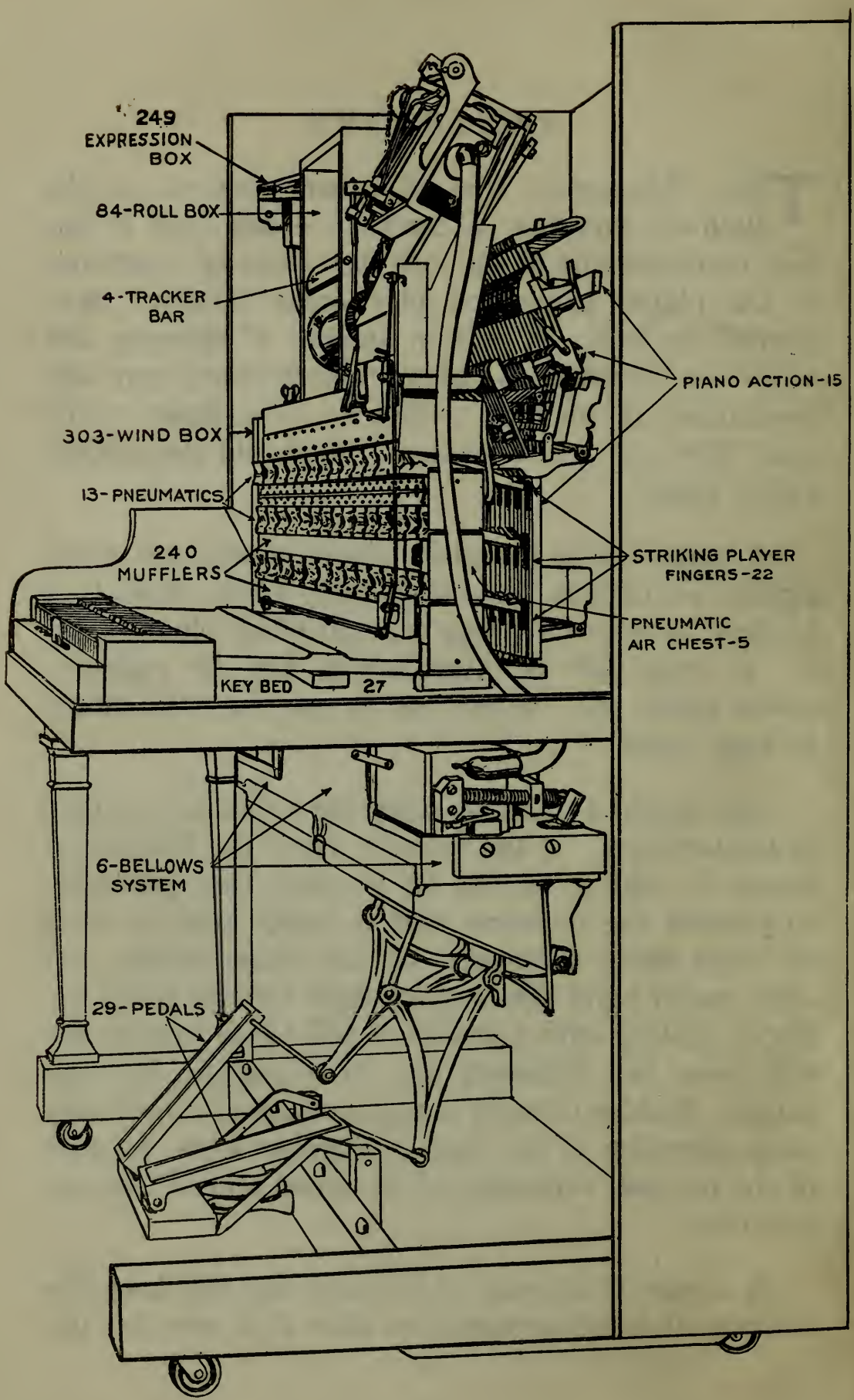
PRELIMINARY

THE "Manualo," like all other products of the Baldwin factories, is carefully constructed of the best materials and along lines that years of experience in the player piano and pipe organ industry have proved the best. A certain amount of cleaning and adjusting, however, is necessary to preserve any fine mechanism in its best condition. The finest watch must have care and attention. So should the modern player piano.

A player piano (or plain piano) should not stand against an outside wall, in a damp room, close to a window, or where a strong draught of air blows across it. It must not be near stoves, hot air registers, steam pipes, etc. When not in use the case should be kept closed.

Nor should a piano be subjected to sudden changes of temperature. If the room in which the instrument stands is cold, it should be warmed very gradually to prevent the moisture that is easily held in warm air from being condensed on the piano strings and other metal parts that require more time to warm up. Rapid heating with a gas stove will cause rusting and will make the hammers and keys sluggish in their action. Sudden changes in temperature will inevitably cause checking of the best of varnish work, because of the unequal expansion of the wood and of the varnish coat.

A moderate amount of frequent use will keep the instrument in better condition than if it were left un-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EXPRESSION
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84-ROLL BOX
4-TRACKER
BAR
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27
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29-PEDALS
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PNEUMATIC
AIR CHEST-5

used for a long time. After long standing idle, the metal working parts should be oiled and the instrument operated a few minutes by playing fast music to get all parts in freely working condition.

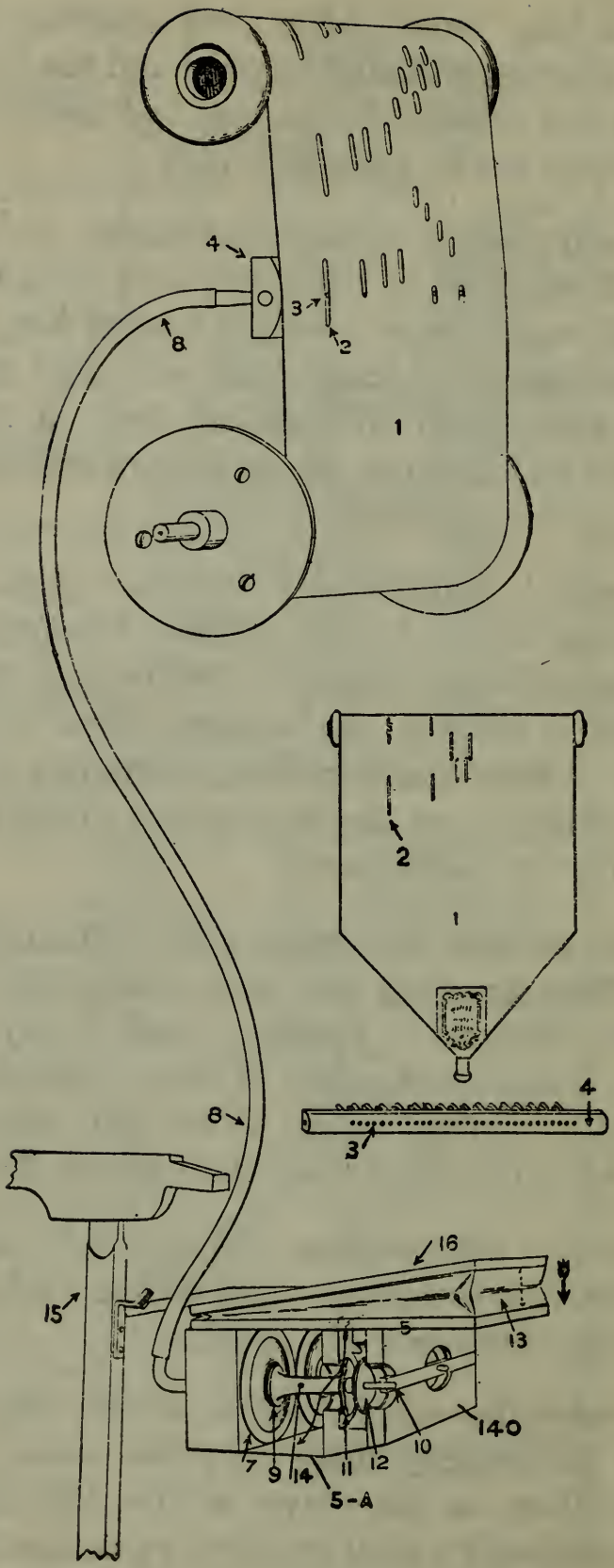
After shipping or carting the player, it is well to place a roll of music in the instrument with the blank part of the music paper over the tracker bar, with the paper standing still, pump hard and pull the paper suddenly away from the tracker, first at the right, then at the left, so that all valves are well shaken to place for perfect operation.

The general structure and operation of the "Manualo" is given in the booklet, "The Fundamentals of Player Piano Construction." The correct use of the "Manualo" is given in the booklet, "How to Play the Manualo." Read both booklets carefully, that you may be certain to get the best results without needless fussing with the instrument.

Do not attempt to regulate the "Manualo" without first fully knowing the facts told in this and the other two "Manualo" booklets, and if any question arises not explained in either of these booklets and not fully certain in your mind, write your headquarters for detailed information from the Baldwin factory.

The factory has a reason, well proved by experience, for each detail it establishes, and will be glad to explain anything you are uncertain about.

Also remember—Fine testing of the player action can only be properly done with the piano action in good regulation, as the player action, like the human fingers, is limited by what results the piano is capable of.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MODE OF OPERATION

A special feature of the "Manualo" is the system of visible valves. When the casing of the piano is removed and the muffler strips are taken off, the operation of the valves is in full view. This greatly facilitates any adjustment or regulation that may be needed for the perfect operation of the "Manualo."

Mode of Operation—

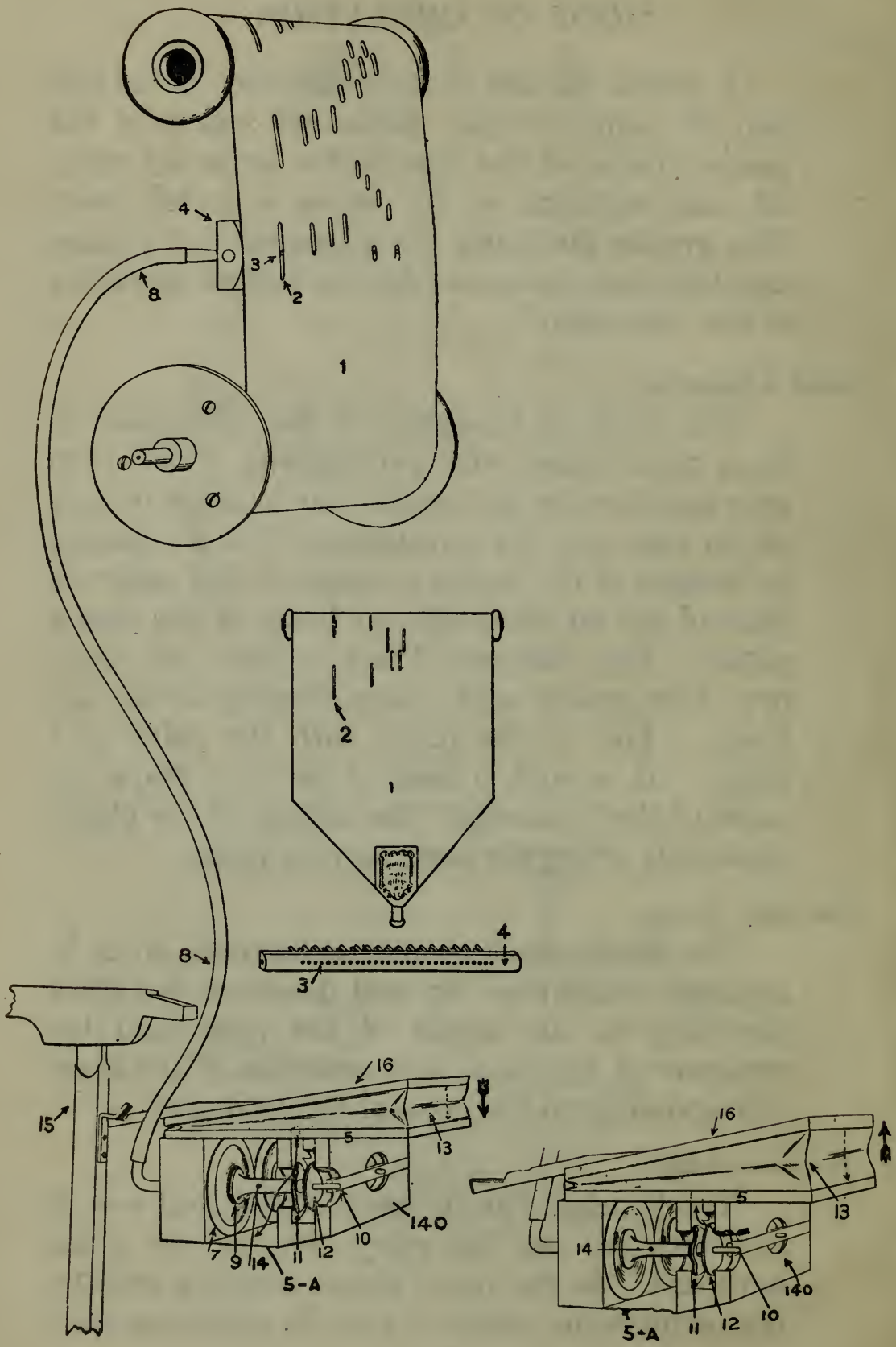
The Mode of Operation of the "Manualo" is by a music sheet with perforations, which open over apertures in the tracker bar to allow outside air to pass into the pneumatics, that air passing in because of the higher pressure of this outer air than of the air inside the air boxes of the player action. For example—Place a piece of paper over your mouth and, while drawing in the air, break a hole in the paper with the point of a pencil. It is such a rush of air that plays the notes of the "Manualo," the bellows of the player apparatus acting the same as your lungs.

The Music Sheet—

The Music Sheet (1) has perforations (2) in it, arranged lengthwise (up and down) of the sheet according to the length of the notes and the measures of the tune, and crosswise of the sheet corresponding to the notes of the keyboard.

The Tracker Bar—

The Tracker Bar (4) has a like spaced row of apertures (3), one for every note of the piano keyboard. As the paper passes over the tracker, the perforations permit the air to enter the aper-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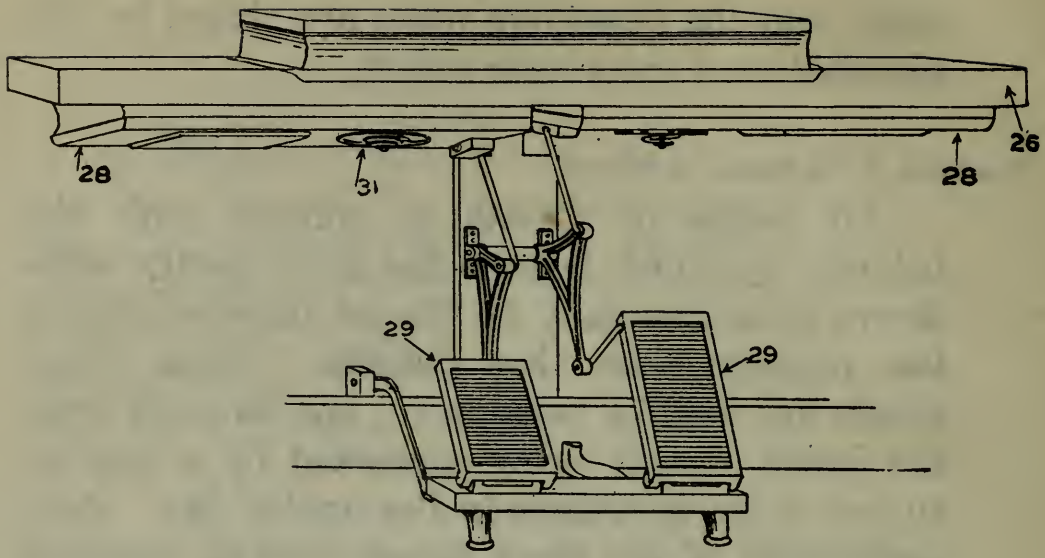
tures, and the respective notes are played by the pneumatics of the player action.

Working of the Boxes or Chests—

Air Boxes or Chests (5) connect with the bellows, by which bellows the air is partly withdrawn from the chest (5), the air therein being of less pressure than that outside. Inside these chests are baglike pouches (7), one for each note, the inside of each being connected by a tube (8) to one of the apertures in the tracker bar. As a perforation of the sheet passes over an aperture in the tracker bar, the full-pressure air rushes down the tube into the pouch and blows it out in the lower pressure of the air-box. This motion of the pouch (7) moves button (9) and rod (10) to throw the valves (11-12) so that the low pressure of the chest is now connected to the inside of the striker pneumatic (13), when the higher pressure of the outside air presses down the moving board (16) and thus strikes that note of the piano.

Return of a Note—

The return of a note occurs when the perforation in the paper has passed away from the aperture in the bar, the outside high pressure air being then closed off from the inside of the pouch. The bleed or return vent (14) connects the inside of the pouch to the same pressure of air as the air box in which it is, and this allows the pouch to be moved back to its original position by the pressure of the outside air on the valves. The inside of the striker (13) is then once more connected with the higher pressure outer air through the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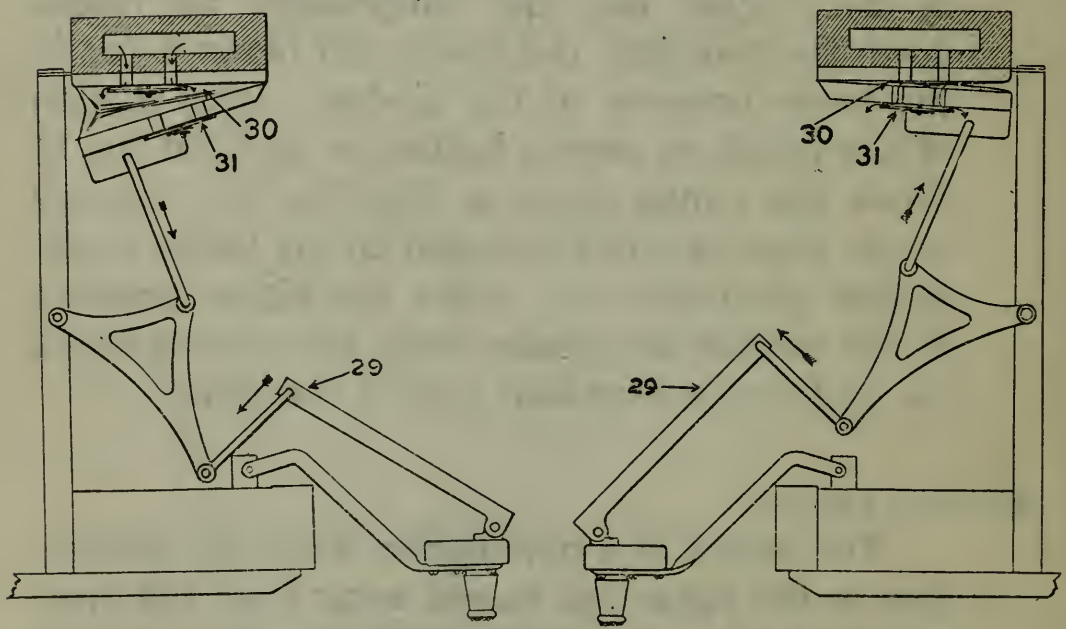
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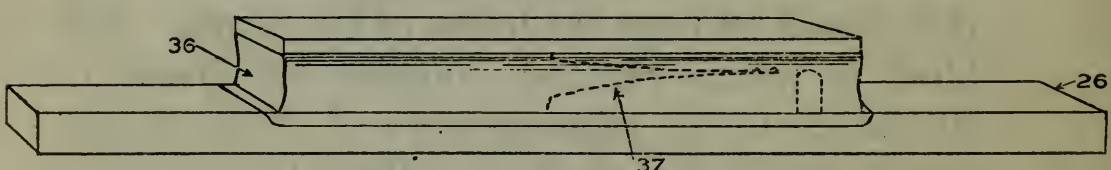
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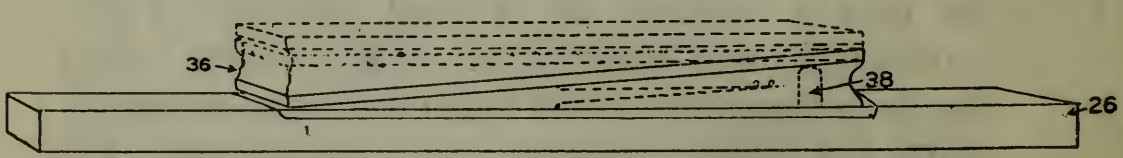
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opening of the valve (12) which has just moved back from the outer hole, and the return weight of the piano action will now press the moving board of the striker up to the original position, ready for another stroke.

The Bellows System—

The Bellows System worked by the pedals (29) acts to pump air from the chest (26) and the reservoir (36) and thereby draws air from the player action chests (5) and reduces the air pressure therein.

The Reservoir—

The Reservoir (36) acts to steady the air between the strokes of the pedals and also to carry the reserve of power needed for expression in the proper rendition of the music. The spring (37) forces it open, thereby drawing the air from the windchest (26) and through the air passages from the player action and the motor, when the pedals are not working sufficiently.

The Accent Block—

The Accent Block (38) inside the reservoir (36) near one end, stops the downward motion of the bellows board at that end of the reservoir as it reaches the point of medium loud playing. The bellows board then moves at its other end only, and twice as rapidly as before, doubling the quickness of accent and change of power. The "Manualo" Accent Block gives both steadiness and quickness of action and the bellows is thus alive when the common type comes to a dead stop for loud playing.

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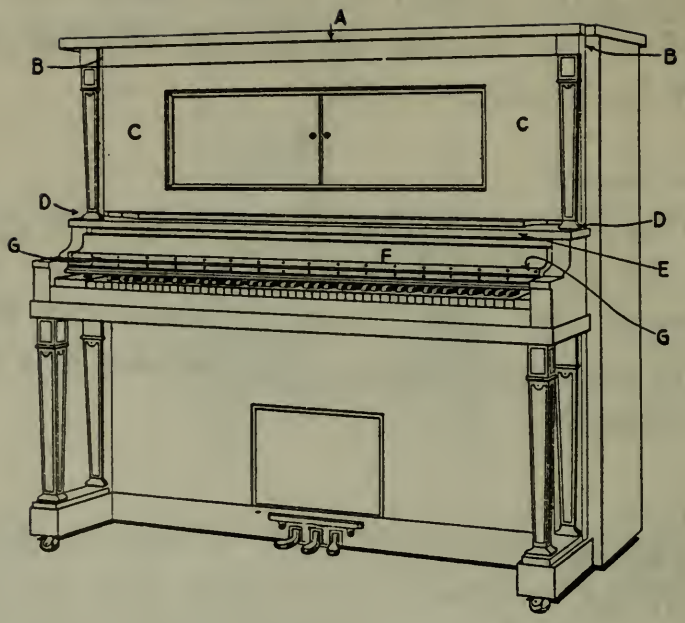
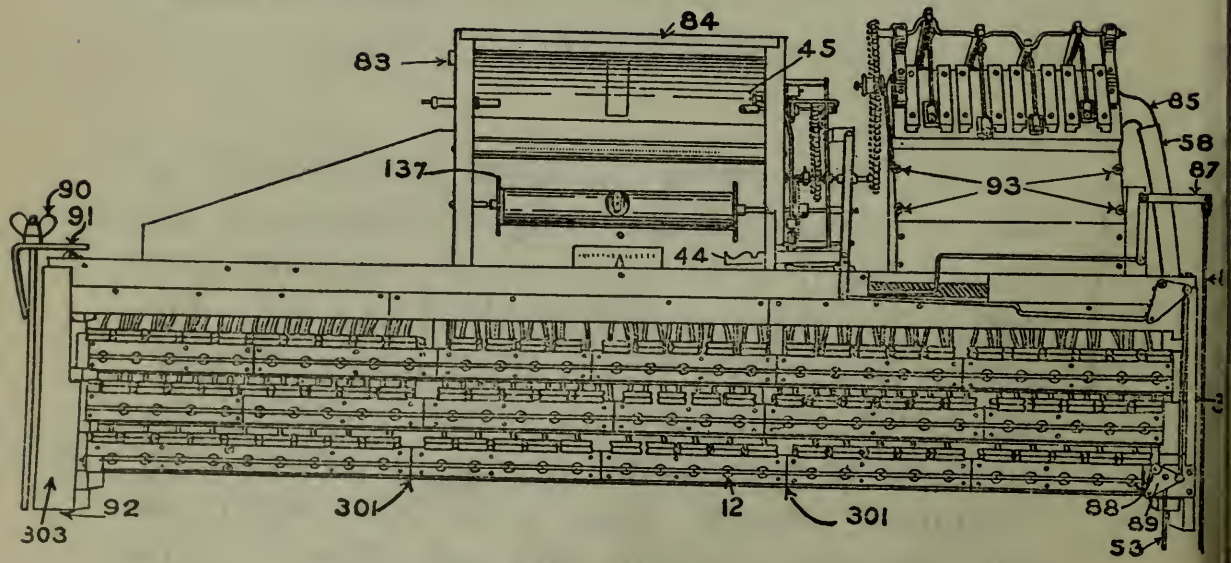




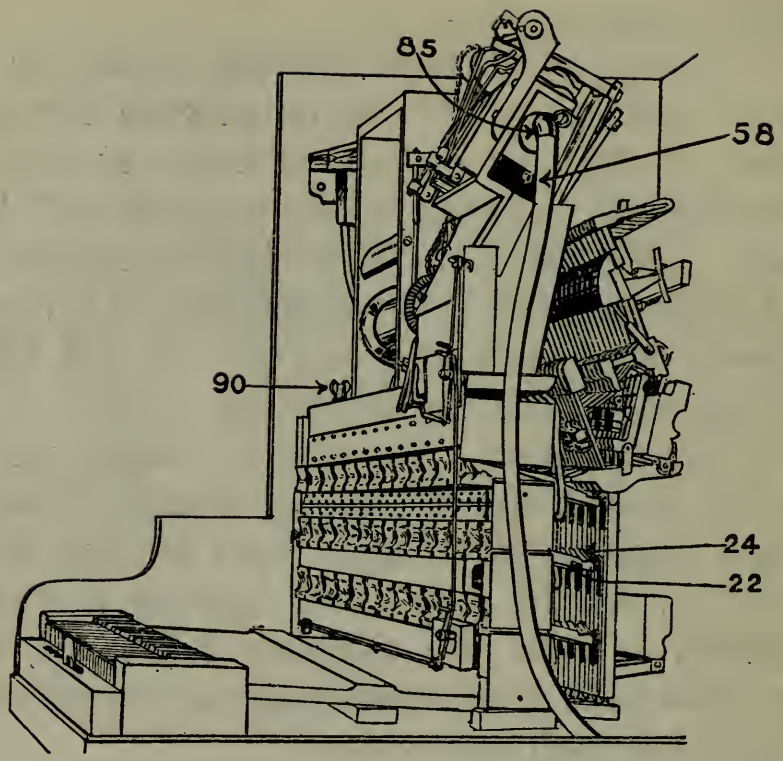
REMOVAL OF PLAYER ACTION

How to Fully Expose Interior—

Lift and swing back the top (A) of the case. Turn loose the catches at (B) at each end of the inside of the case at top of front, at the same time holding the front frame (C) from falling forward. Lift frame (C) up to clear its holding pins at bottom, and lift forward and out. Remove the screws (D) at each end of shelf (E) and lift out this shelf. Raise the fall-board (cover) (F) and fold it in as shown. Remove the large screws (G) at rear of each end of the back-board of these fall board or cover parts, and, while holding the fall board (F) and its rear board together at the top, carefully lift out the complete fall-board, being sure that both ends come evenly at the same time to avoid scratching the case.

How to Remove Player Action—

Then take off brace (83) from roll box (84). Slide hose (58) down and off flange (85) of motor, loosen top of wire (86) from bell crank (87) and catch that wire in front of a hook or pin—driven in right arm of case so that the wire will be well away from the player action. Loosen screw (88) just enough to pull bell crank (89) forward and push back bend of wire (53) out of its hole in bell crank (89), or snap the wire off its spring clip on some of the instruments. Then throw wire (53) forward and right in its hole in the keybed. Now remove wing-nuts (90) and clamps (91) at each end of the player.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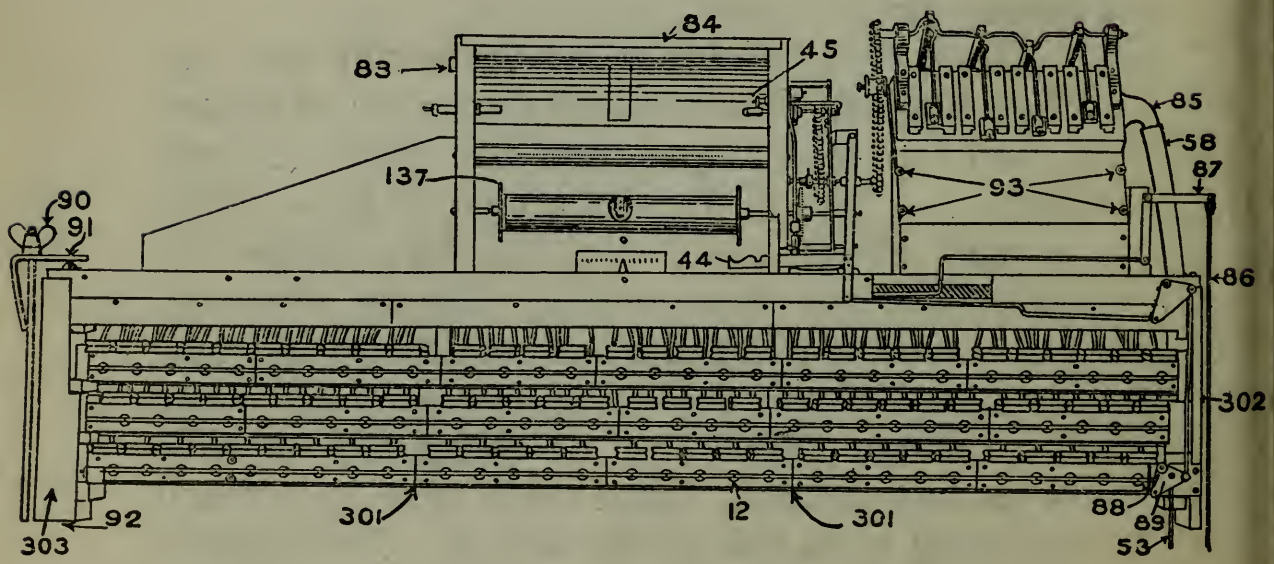
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Be Careful—

Pull the player action forward before lifting, so as to clear the player fingers (22) from lugs (24), then carefully lift up and out, keeping the fingers (22) at rear of player free from hitting the piano action.

Replacing of Player Action—

Replacing player action is done by keeping it well forward to clear fingers (22) as it is first dropped to keybed, then shoving it back to place, and to the left end. Replace left clamp and wing-nut first, and tighten. Then replace right clamp and nut. Connect brace, hose and wires. Before replacing, see that there is no dirt where the action is to rest, and that leather (92) at left is all right.

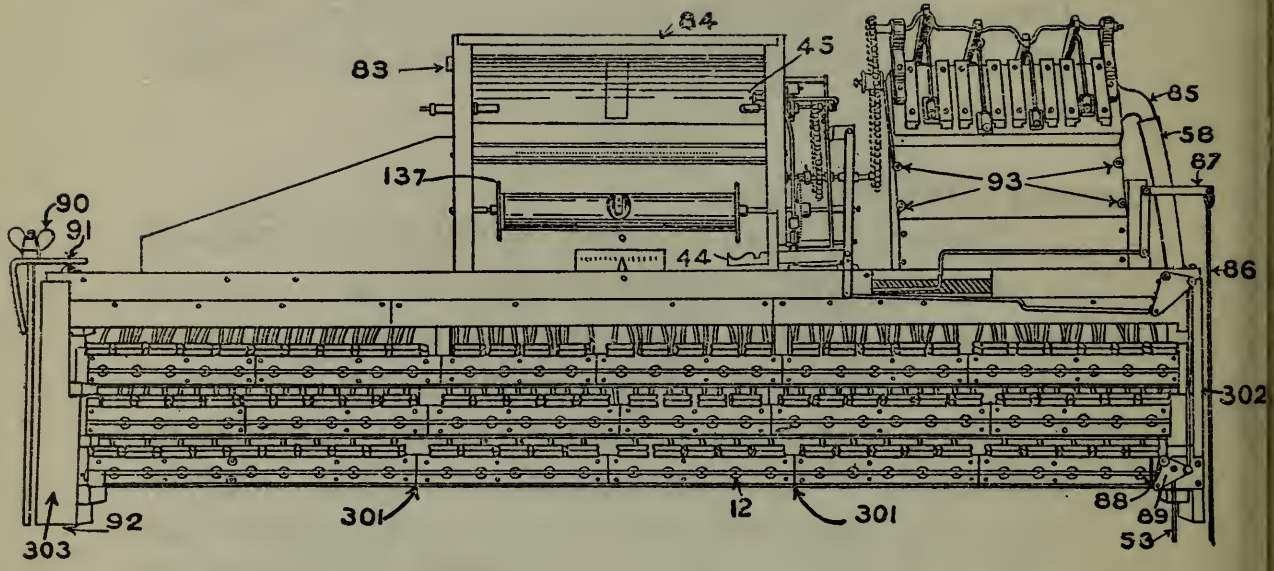
When Removal is Required—

Removal of player action is only required when regulating piano action, or when some exceptional work needing access to rear of player, as the tubes or fingers, is to be done.

When Not Required—

All usual tests and regulation of the "Manualo" player action are possible from the front while the player is in operative position in the piano. One of the features of the "Manualo" is that it permits the greatest ease in observing all the working parts in operation.

If the whole player action needs raising because of settling of various parts, this is best done by shimming up at each end with cardboard, cutting out a rectangular hole in the piece for the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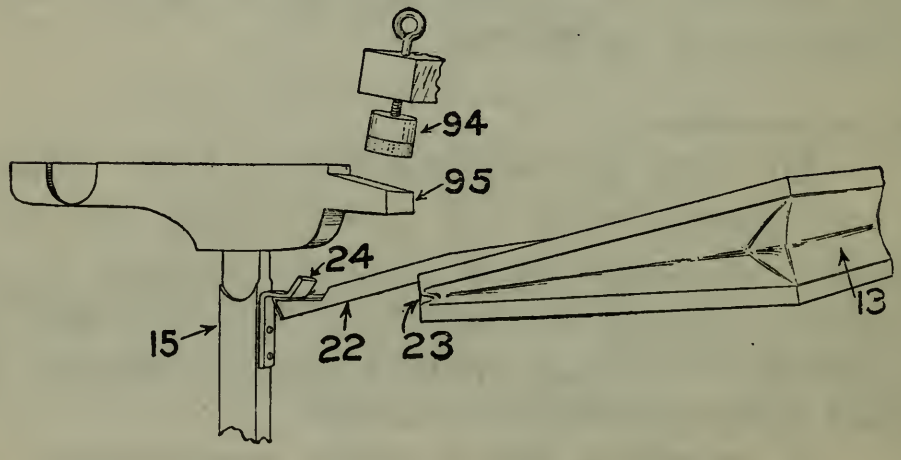
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bass end to fit on the building block on which the end trunk (303) rests.

Taking Off Motor Only—

Tuning is usually done without removing any part of the player, although the motor may be taken off by loosening the four screws (93).

Check Buttons and Wippens—

Check Buttons (94) check the throw of the wippens when the player action is operated. They should be set so that any wippen (95) will just touch its corresponding check button (94) when the piano key is strongly struck and firmly held down. Be sure that the piano action is in good regulation, the key of proper dip, and the capstans correctly adjusted before regulating these checks.

Regulating Single Piano Action Notes—

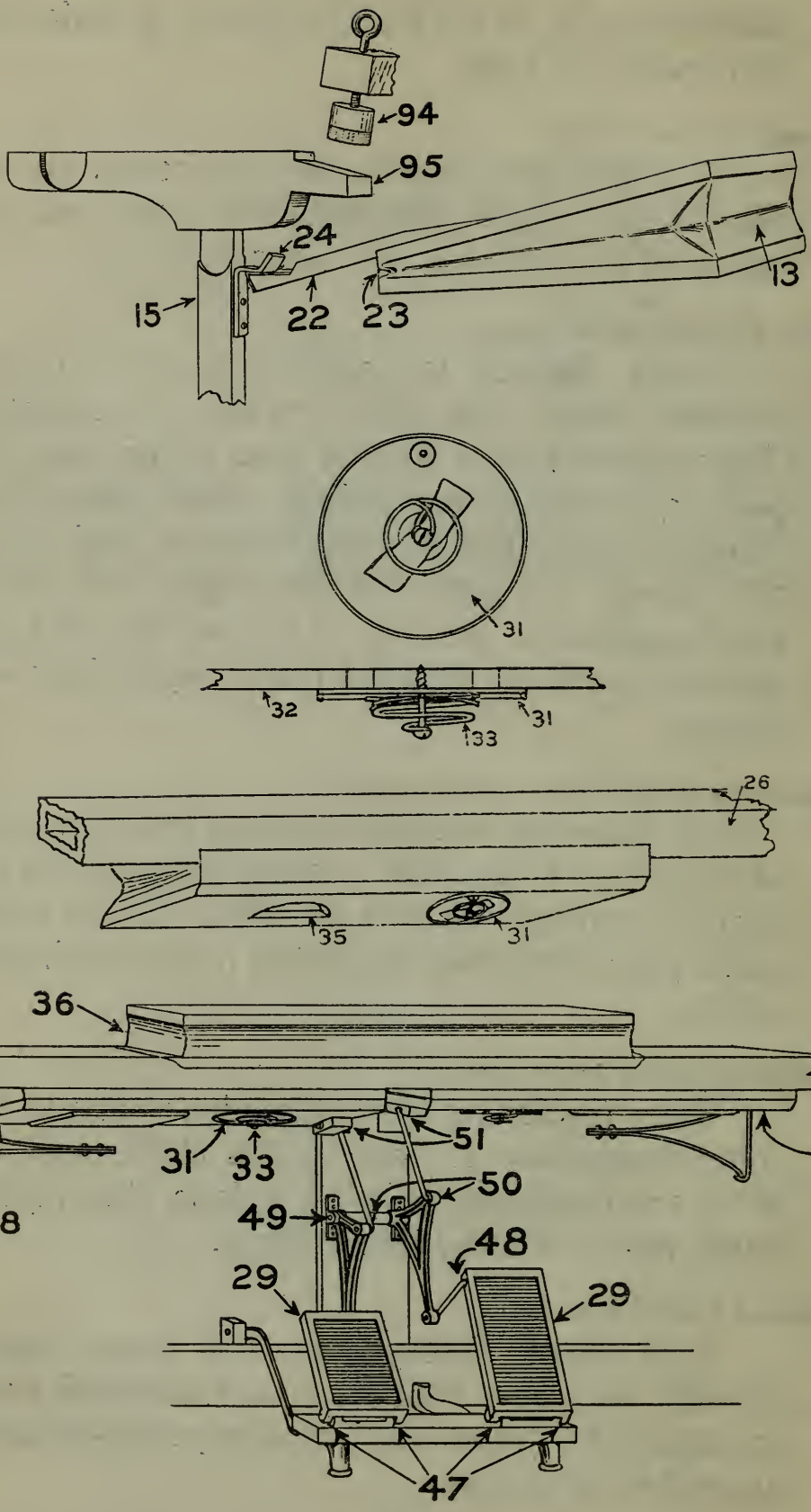
When testing or regulating one or a few notes of the piano action, the corresponding checks (94) may be screwed up free of effect on the piano action, and afterward regulated down as directed above.

Regulating Entire Piano Action—

When regulating the entire piano action, it is more convenient to remove the check rails entirely until piano action work is done, then replace check rails and fine-regulate them.

Balanced Pneumatics—

With these checks and the piano action brought to proper regulation, the balanced pneumatics of the "Manualo" are always self-adjusted to perfect operation.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Loosening Striker Pneumatics—

Should any accident cause a striker pneumatic (13) to close tight together instead of slightly open at the end of its stroke, the lug (24) can be carefully bent down. If the striker (13) should be stretched tight at the top, the lug (24) can be carefully bent up.

PEDALS, BELLOWS AND BELLOWS VALVES

Pedals—Oiling Same—

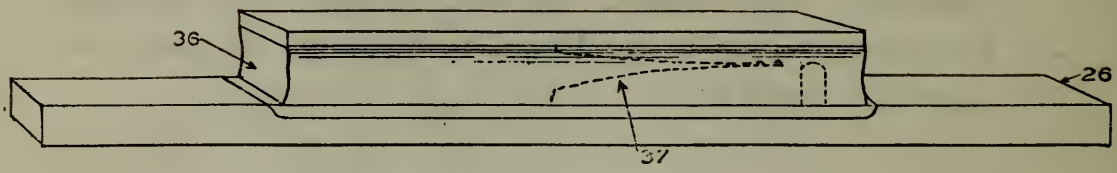
Oil at metal bearings (47) to (50) with machine oil, and the wood bearings (51) with tallow or vaseline. *Never* use olive or vegetable oil.

Bellows—Greasing of—

Springs at end of pumpers (28) if squeaking, should be greased with tallow or vaseline where their points bear, being careful not to get any grease on the cloth of the pumpers to spoil it. Squeaks in pumpers (28) themselves may be in the inside of their hinge joint, or where the inside cardboard forms bear on the wood. Paraffin rubbed on inside will stop this.

Pumper Valves—Squeaking of—

Pumper Valves (31) and Springs (33) may squeak when old and dry. Cure this by tallow and black lead at the parts rubbing on the center screw.



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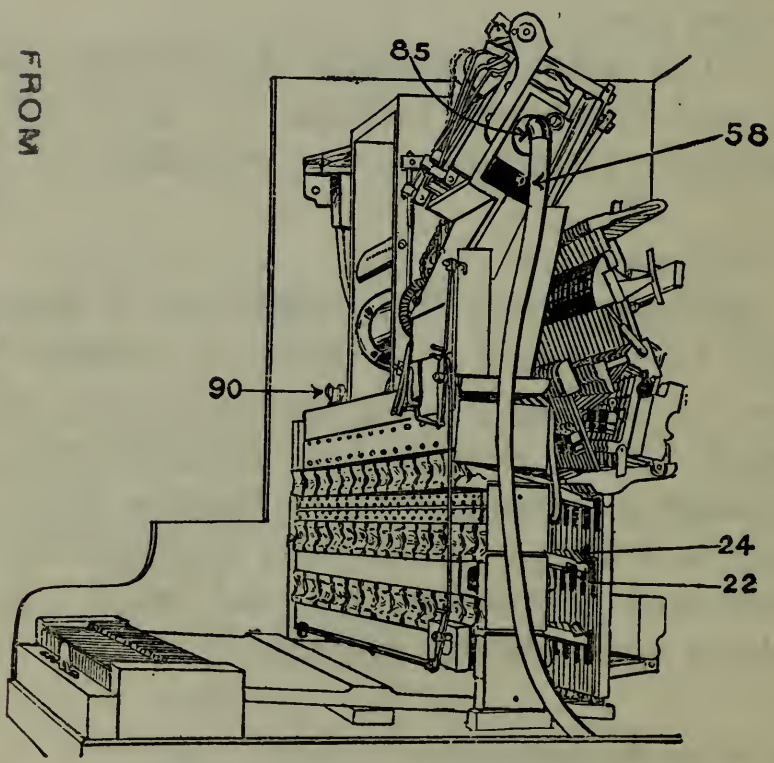


Springs of Pumper Valves—

Pumper Valves should have their springs just strong enough to slightly overbalance their weight to prevent any "slapping" noise when they close with the air flow. Springs must not be over strong, as they would then drag the air flow and prevent easy pumping and quick accent.

Bellows—Loss of Air from—

Loss of air from bellows is usually caused when dust or dirt gets on the leather facing of the pumper valves. Clean the leather surface carefully with cloth or a soft brush, stroking the surface in the *one* direction that will stroke smooth. Finish smoothing with talcum.

How to Reach Inner Valves—

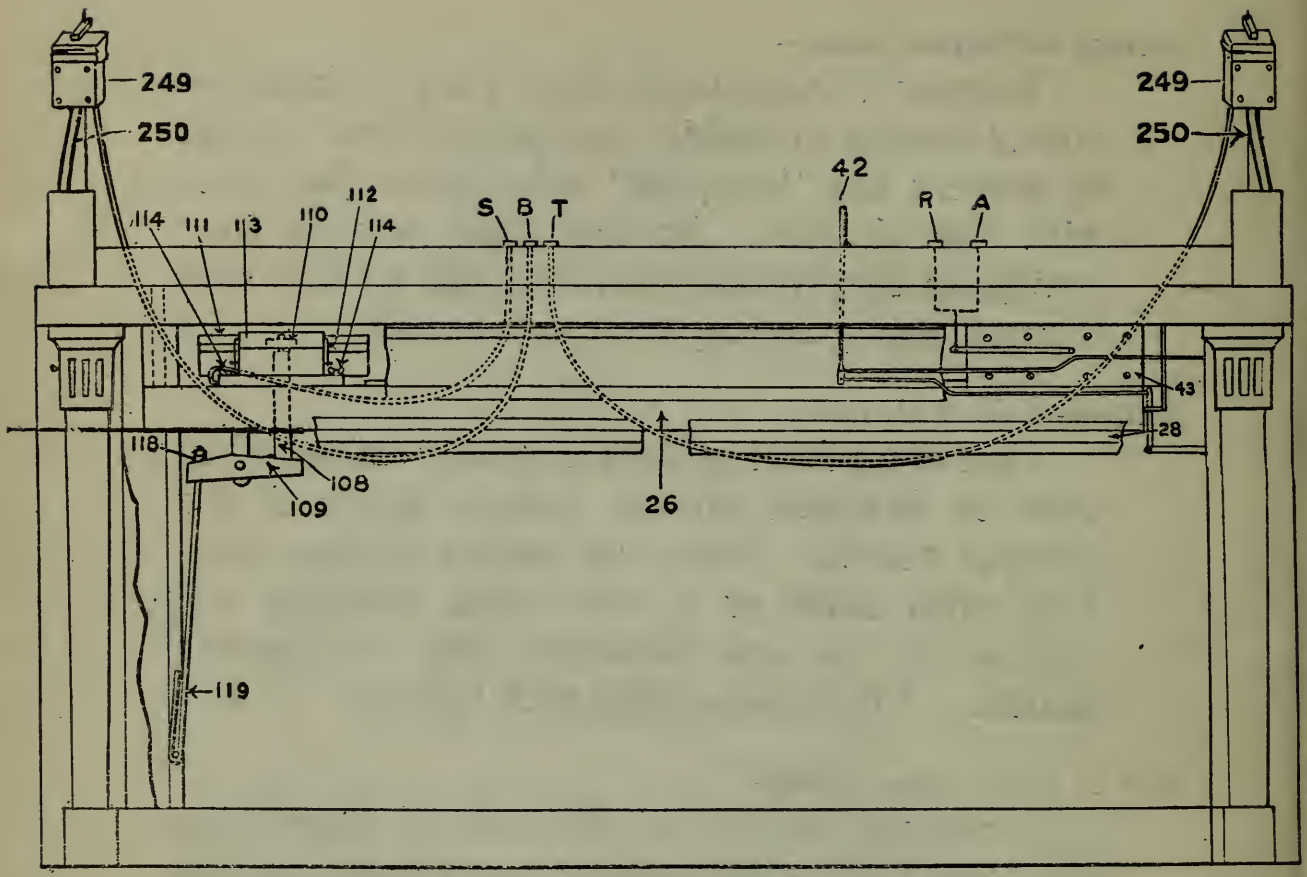
Inner valves can be reached by unscrewing caps and pulling off seals at hand holes (35) (see cut page 12). Carefully reglue the seals and rub over with a warm iron.

How to Reach Reservoir Springs—

Reservoir Springs (37) can be reached by tearing off sealing-cloth from *top* of reservoir (36).

How to Find Leaks at Joints—

Leaks may occur at any joints. They can be found with a ⅜ or ½-inch rubber tube having one end placed to the ear and its other end passed all around the bellows while the bellows is strongly pumped. (Before pumping listen to the natural sound of the tube itself.) When testing the bellows, have the upper action closed off as for rewinding, and the hose (58) to the motor disconnected and plugged at its upper end. Screwed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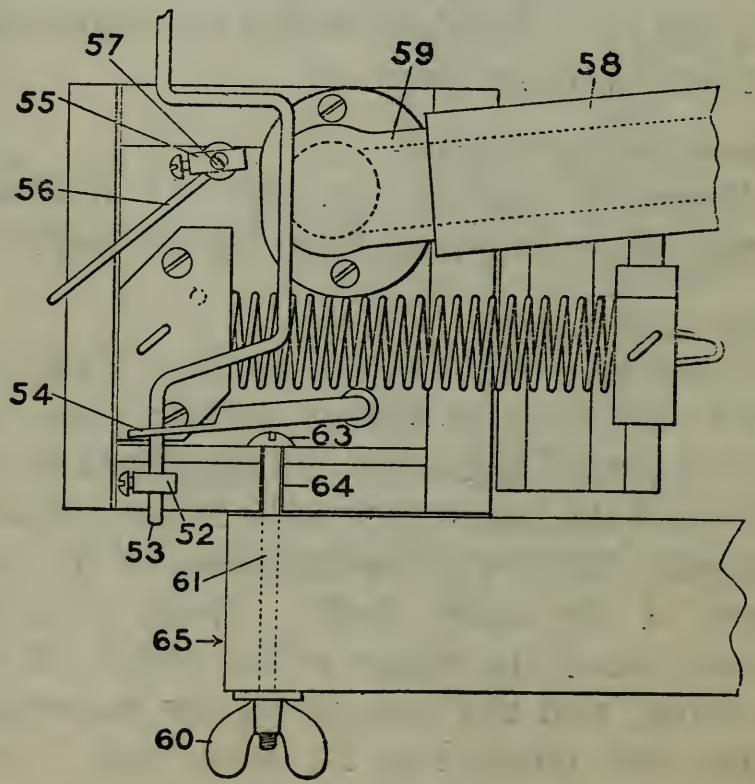
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and leathered joints should be tightened. Any cracks in the wood from overheat should be sealed over with leather or rubber cloth, glued on.

Leaks in Bellows Rubber Cloth—

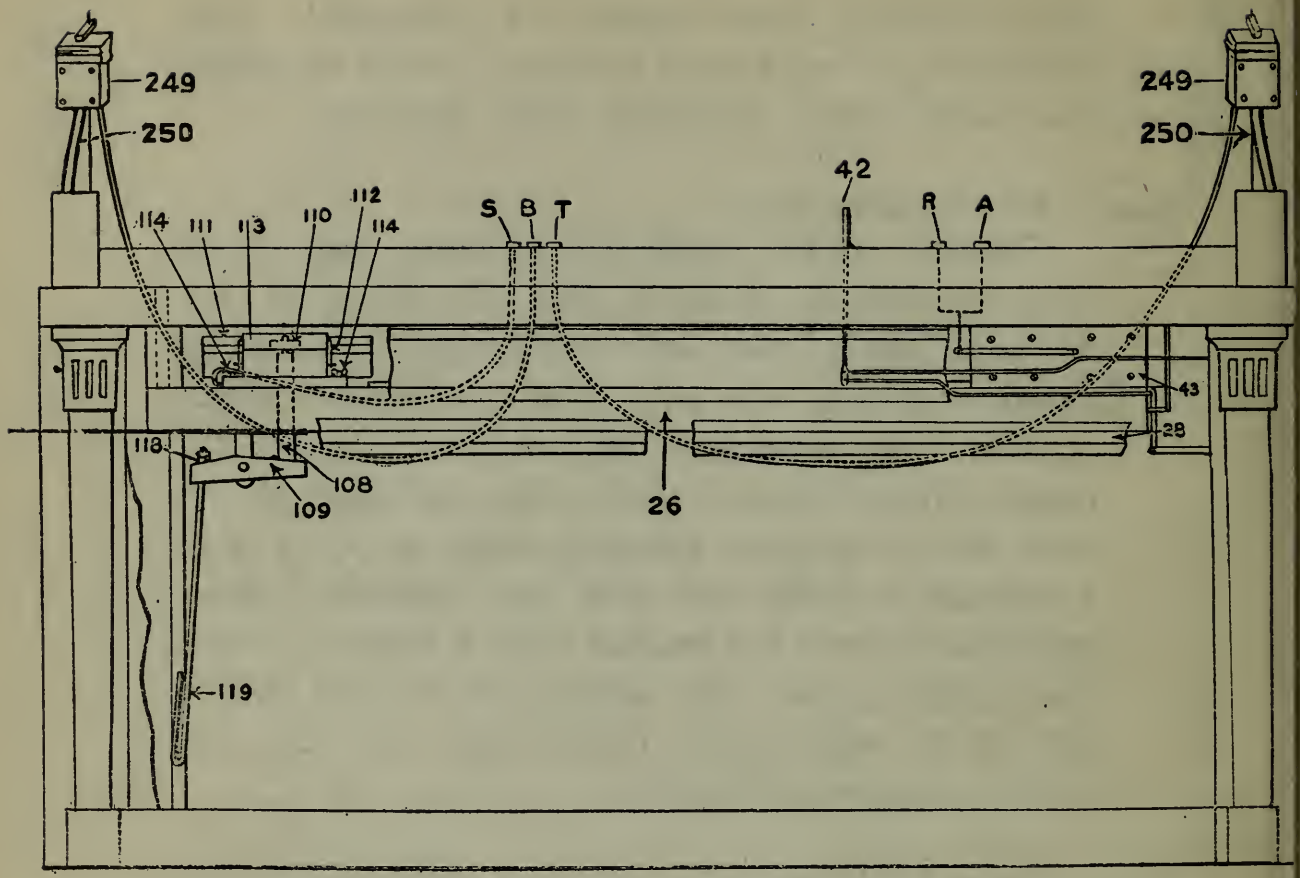
Bellows rubber cloth will in time wear at its bending corners, first at the big folds at the corners. Such leaks show black marks and can be cured by gluing over with alum tan sheep leather, applied with thin, hot cabinet glue laid on the rough ("flesh") face of the leather, and then placed over the leaky part, rubbing down to place with a sponge or cloth wet with hot water and glue, smoothing down the leather with a bone or ivory. The leather patch lies better if it is first skived thin at its edges on its rough face. (N. B.—See corner leathers of bellows.)

Leaks in Joints of Bellows—

The Joint of Bellows to the wind-box at left end should be tight. See that screws are up snug, and that joint of wind-box is air-tight to keybed.

Tempo Governor Box—How to Remove—

Tempo Governor Box (43) is on top of bellows chest (26) at right end. To remove, move handle (44) (p. 11) in roll box to the left. Loosen and remove clip (52) from wire (53), and carefully lift wire (53) out of the crank arm (54) without bending either. Move tempo handle (42) to right. Loosen screw clip (55) and remove from wire (57) and slide loop of wire (56) to right and off of wire (57), then to left and forward and drop. Put your right hand under and to right of box (43), grasp hose (58) and slide it back and off of pipe (59). Loosen wing-nut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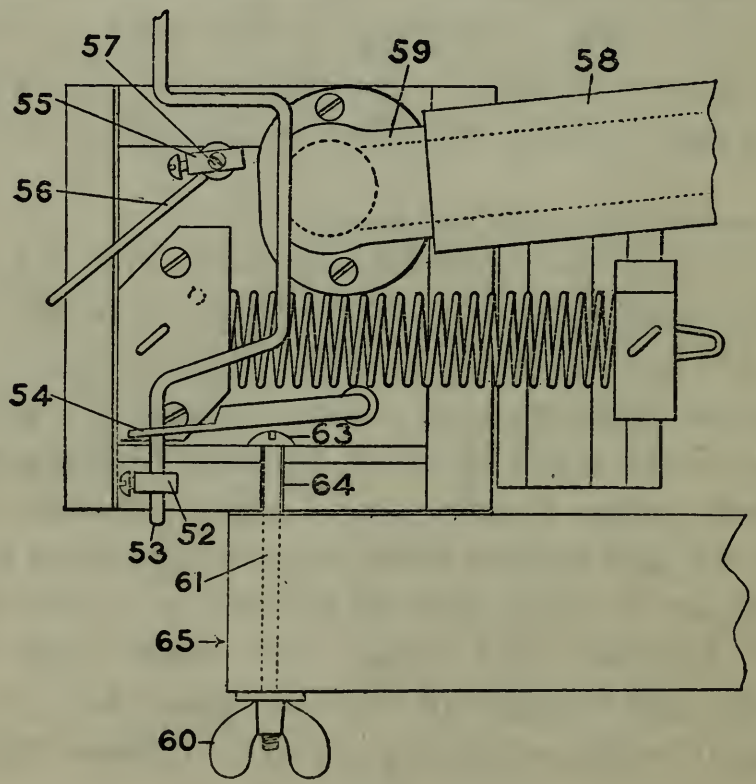
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(60) by turning leftward, then pull box (43) forward a little at its right end and slide the bolt (61) to right and remove. Shove box (43) to right to clear its slot (62) (p. 16) from screw (63), and pull its left end forward, and whole box out of case.

Tempo Governor Box—How to Replace—

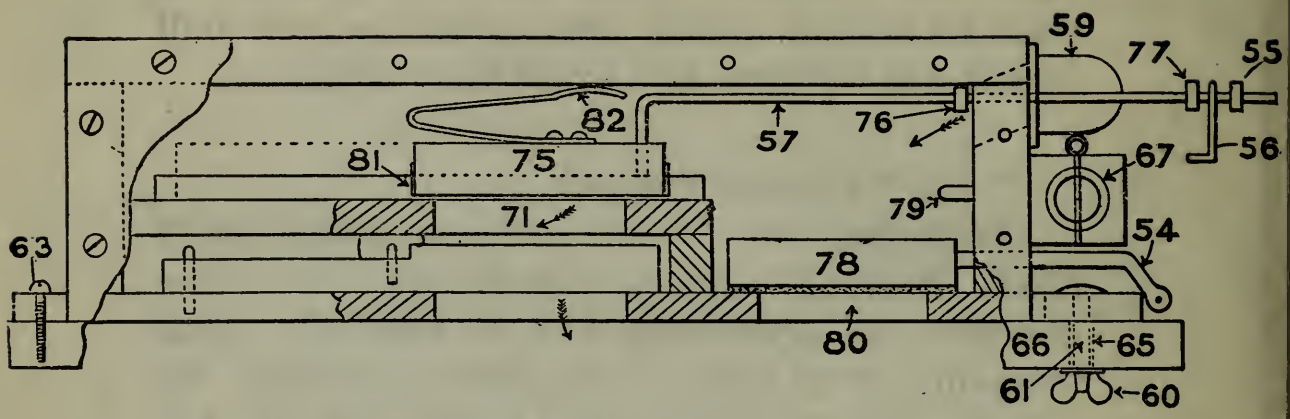
To replace box: Put in right end and shove to right. Swing in left end, slip slot (62) under head of screw (63) and shove box to the left. With wing-nut (60) on bolt (61), slip bolt (61) into slot (64) of box with the round top of bolt over the top of slot (64) with the bolt in front of slot (65) of block of bellows chest (26), and then push box backward at its right end with the bolt (61) in slot (64). Now tighten wing-nut (60). Replace hose (58) on pipe (59). Put wire (53) in hole of crank arm (54) and fasten the clip (52) at 5/16 inch below arm (54). Slip loop of wire (56) on to wire (57) and against clip on wire (57) and then fasten clip (55) on wire (57) against loop of wire (56).

Removal of Governor Box—

Removal of the Tempo Governor is only necessary when doing general cleaning and overhauling, or to correct governor spring.

Speed Regulation—

Governor Spring (67) (p. 16) is correctly regulated when a 2 lb. 4 oz. weight resting at $2\frac{9}{16}$ inches from the hinge end (18) of the governor pneumatic (69) (p. 16) will just start the moving board (70) of the pneumatic (69) to drop, the box being laid with the pneumatic on its top, and level. This weighting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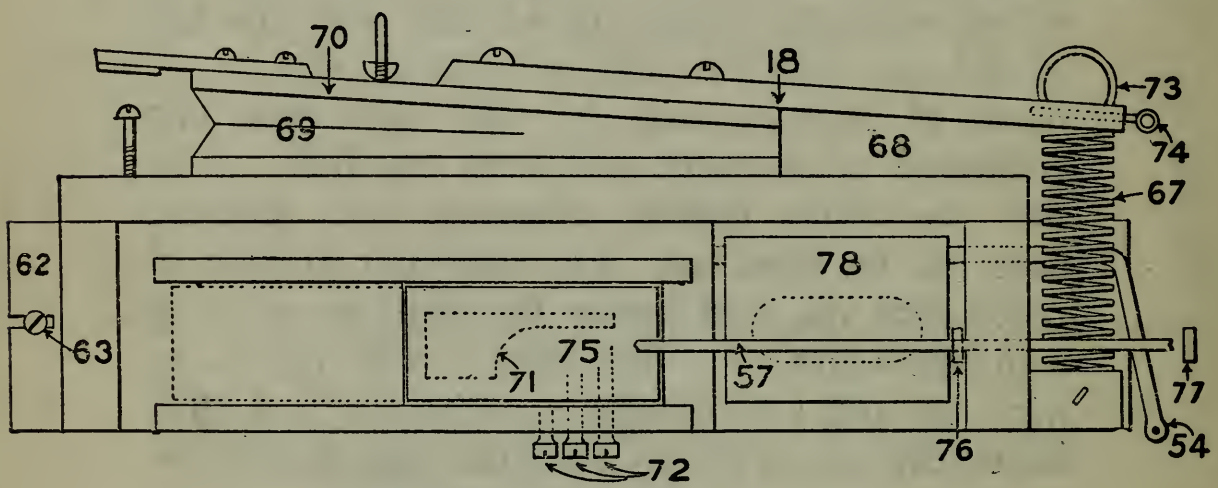
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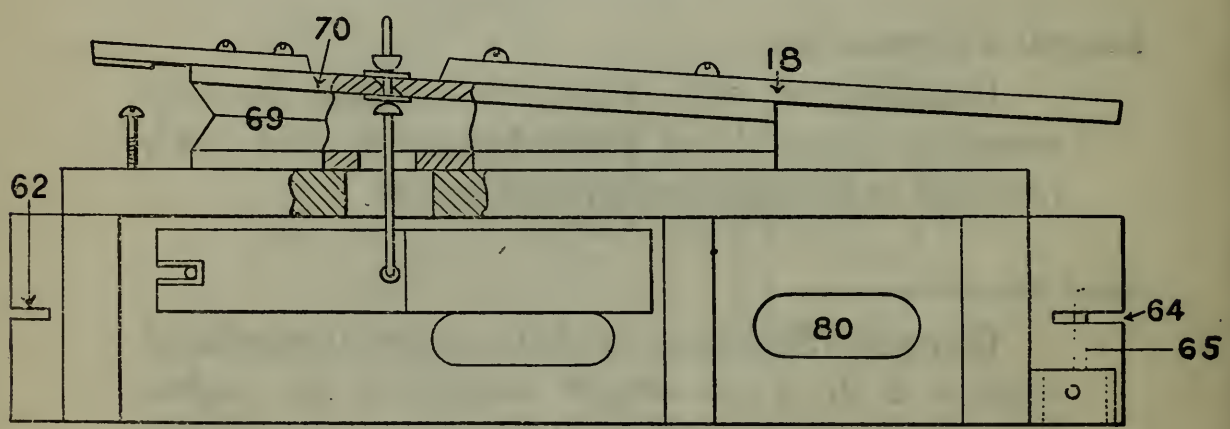
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must never be varied from, as it is necessary for steady running with varying pumping. The speed must never be regulated by the governor, but by the valve slot (71) and regulating screws (72). This is very important.

These screws when turned in, reduce the speed. When turned out, increase the speed, affecting the tempo at the 40 to 70 portion of the indicator scale. The music sheet should run 7 feet in one minute when the pointer is at 70.

Correcting of Governor Spring—

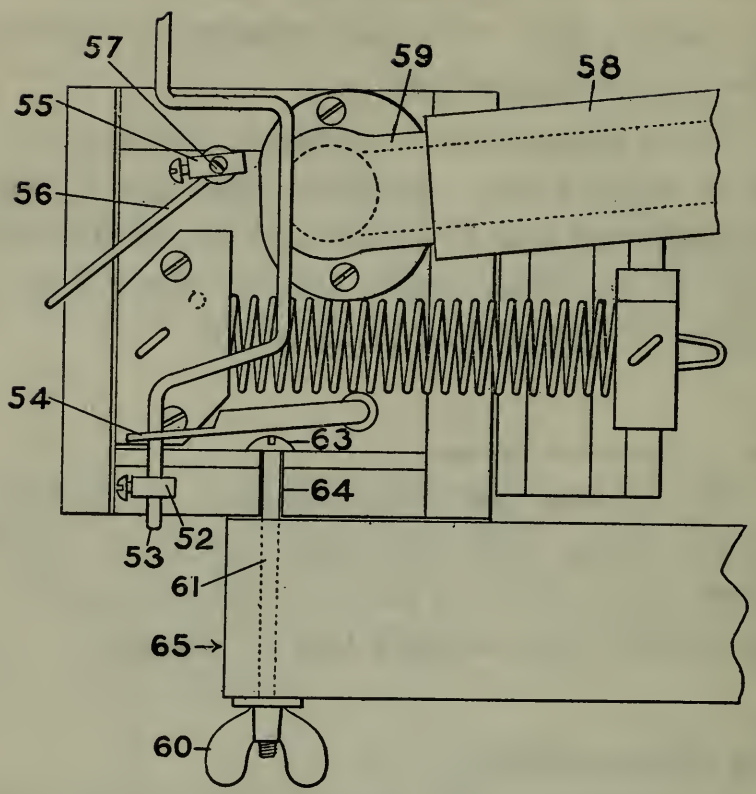
Should the Governor Spring (67) require correcting, take hold and pull on ring (73) of the spring (67), pull out pin (74), let spring in or out and replace pin (74) and test by weight.

Examining of Tempo Valve—

To examine the Tempo Valve (75), etc., the front cover of box may be removed by loosening its screws.

When Tempo Valve has no leather, true the valve and seat as instructed in paragraph 3, page 18.

Tempo Valve (75) is held by the wire (57) at closed position at right with the right end of the valve ⅛ inch beyond the end of the slot (71), being checked to that limit by a stop clip (76) on wire (57) inside the box. A similar stop (77) on wire (57), but outside of the box, limits the valve opening motion to the left, so that the valve, when fully open, stands with its right end ⅛ inch to left of the left end of slot (71).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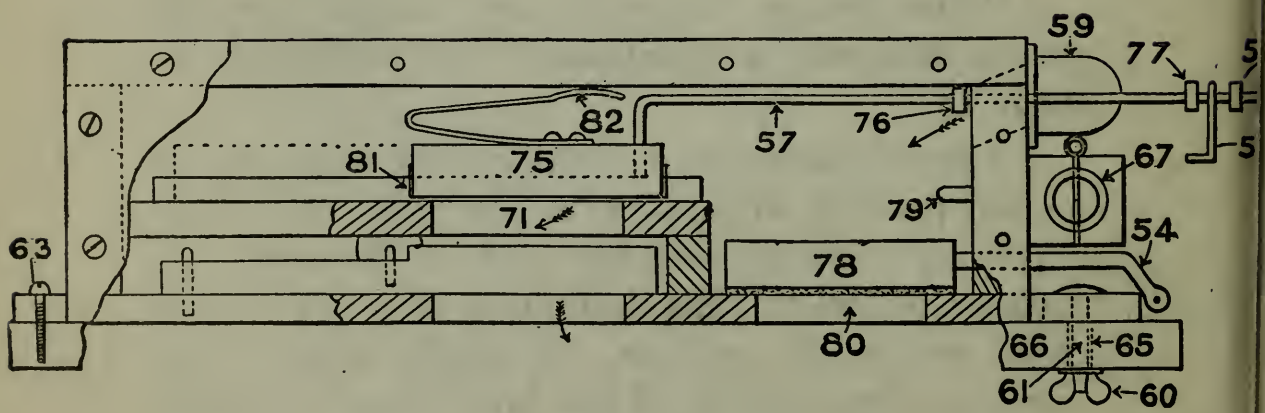
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Tempo Handle Motion—

Thus, the total motion of wire (57) is 2⅛ inches, as measured from the outside of the end of the box to felt washer inside of outside clip (77) on wire (57). The tempo handle (42) (p. 15) should give the full 2⅛ inch motion of wire (57) from its stop at one end of its throw to its stop at the other end of its throw.

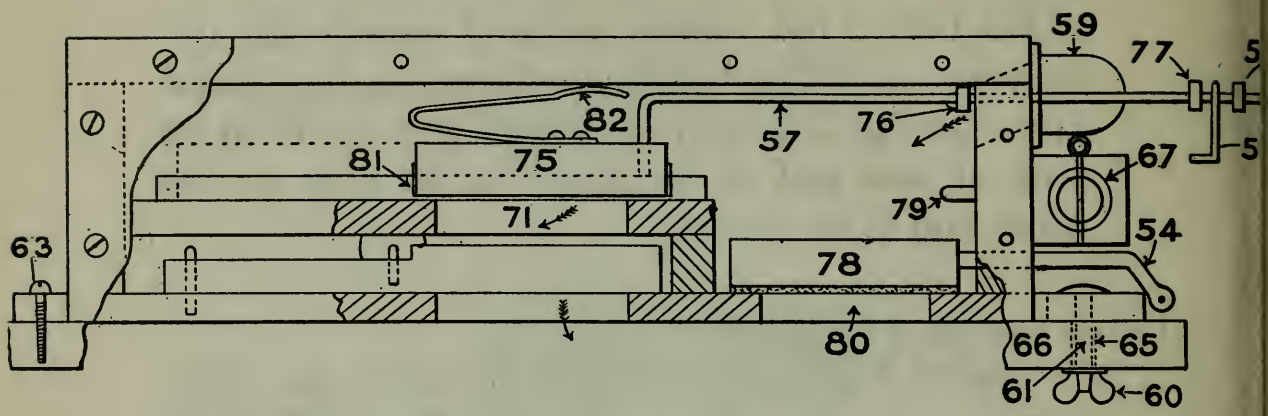
Correct Position of Reroll Valve—

Reroll Valve (78) is raised by wire (54) when handle (44) (p. 11) is shoved to right for rerolling the music sheet. The clip (52) should be set 5/16 inch below arm of wire (54) when handle (44) is at its leftward position, so that when handle (44) is moved to the right for rewinding, valve (78) will be well raised but *not* crowding against the stop pin (79) inside the box. When the reroll valve is dropped, it must freely rest on its seat, and not be crowded by clip (52) pressing on crank (54) between which there should be a free space.

Any crowding or other leaking of this reroll valve, even though not enough to make the motor move, will cause a loss of air-tightness, and loss of strong accent on loud playing.

Motor Trouble Due to Leakage—

Motor not stopping entirely when shifter (44) is at its leftward position and tempo handle (42) thrown to the left, is caused by a leakage of air past tempo valve (75) or reroll valve (78). After seeing that these valves are in correct position as formerly described, and connections not crowding either from its seat, look for any small dirt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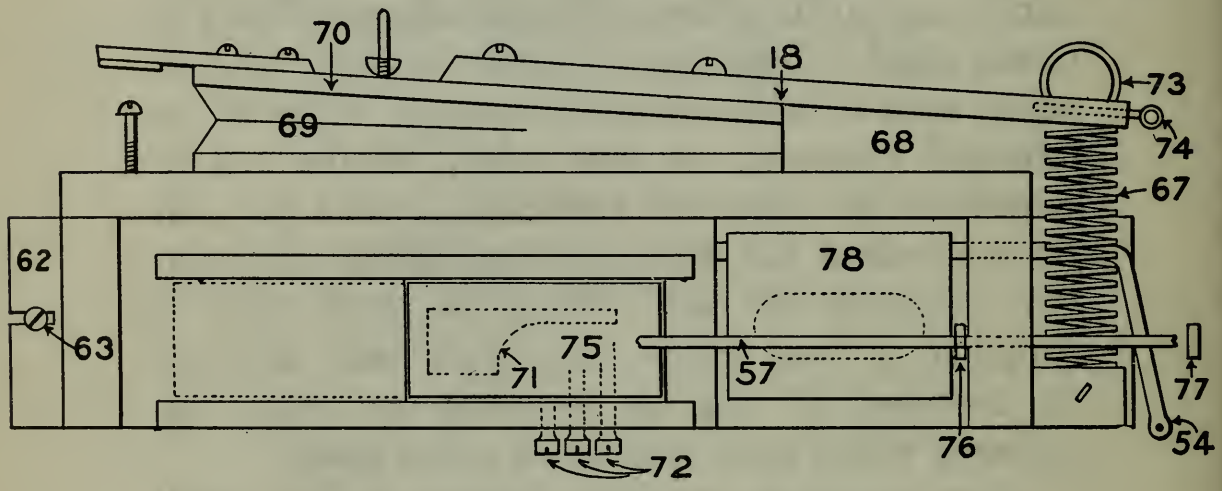
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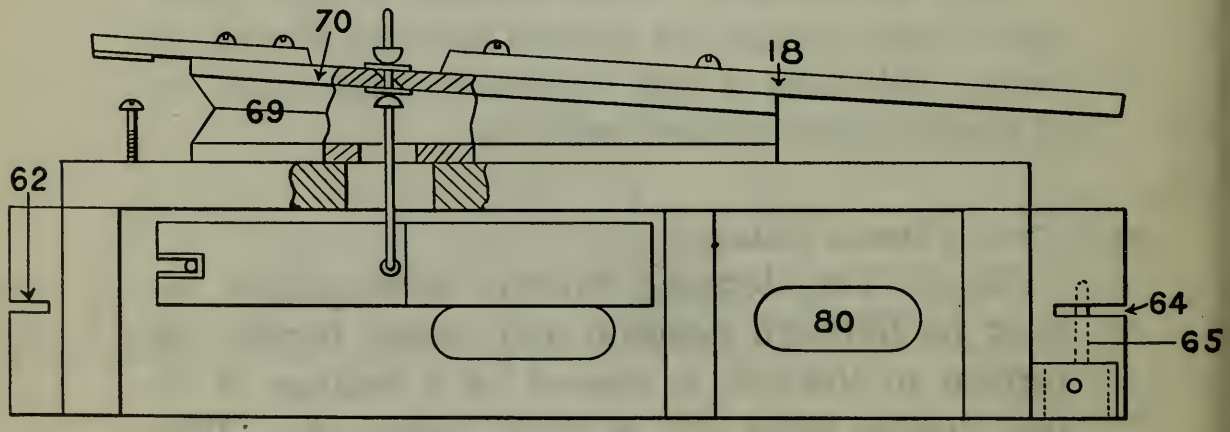
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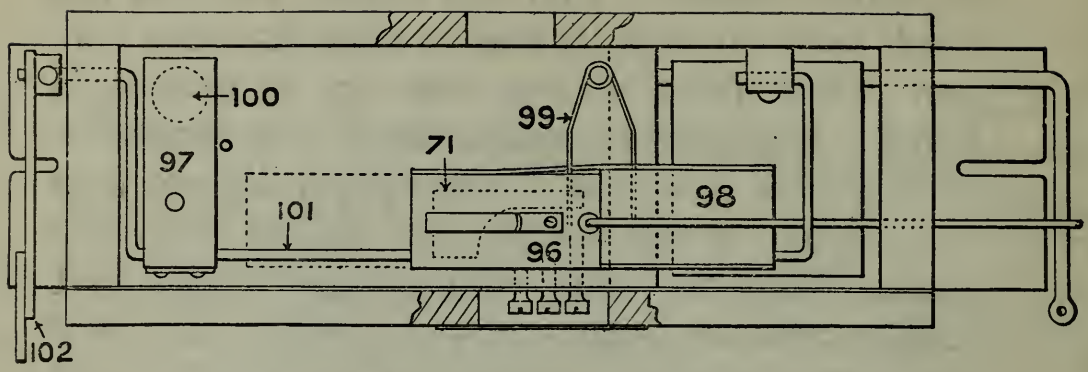
that may be under either. If none, place a piece of writing paper or thin soft leather between the reroll valve (78) and its seat to close its valve hole (80). Close front of box and try if trouble is cured. If so, further examination and correction of *that* valve is needed. If the paper did not stop the motion of the motor, the leak is from the tempo valve (75). Slip writing paper or thin soft leather between tempo valve (75) and its seat over the valve hole (71). Close the front cover and test.

Leakage Caused by Dirt Particles—

If the motor has stopped, the leakage is from tempo valve (75) which in some styles without interpretation device is covered with thin loose leather (81). See that the leather is flat and smooth, and no dirt above or below the leather. See that spring (82) is pressing the valve (75) down flat—if not, straighten or stiffen it.

With this leather-faced valve a slight change of the seat from flat is not likely to cause any leakage, as the leather will suck down to it, but if other cures have failed, test the seat with straight edge (a visiting card will do), and if not flat, correct it with a fine-cut file, or by 00 sandpaper held on a flat file, stick or knife. Thus we have stated the entire features of the *plain* Tempo Governor Box.

If the leakage is not at the valve, stop any possible leakage at the joint between the valve seat and the back of the box by flowing glue along the joint.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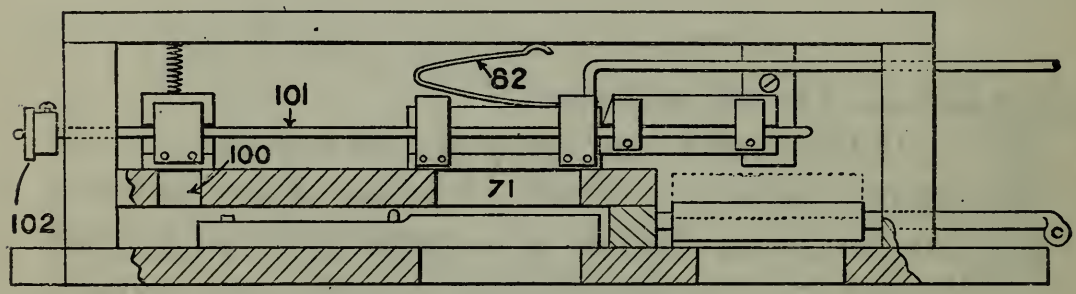
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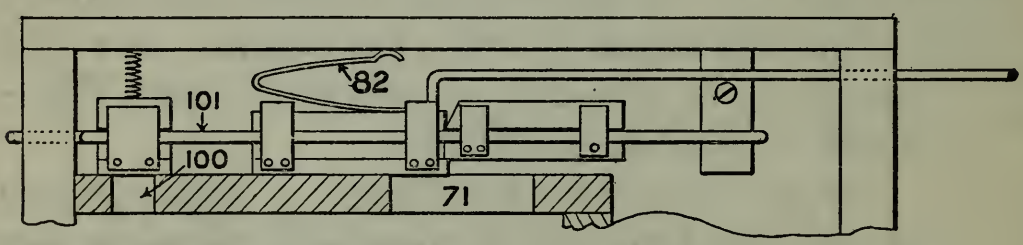
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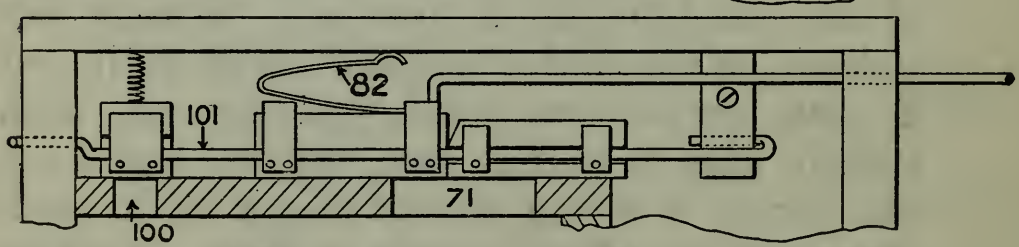
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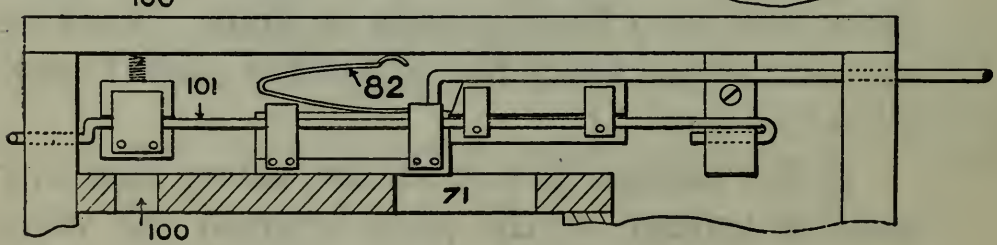
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Any squeaks can be stopped with dry powdered black lead (plumbago) in the cloth-lined bearings and on wood above spring (82).

The Interpretation Device—

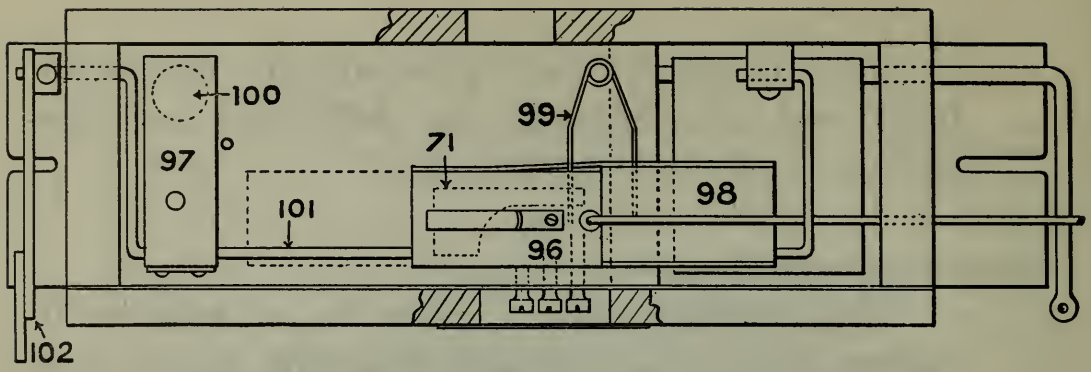
The Interpretation Device is an additional feature of the Baldwin and Ellington styles, and includes two extra valves in the tempo box, a trailer and an accelerator.

Tempo Valve, Trailer, Accelerator—

The Tempo Valve (96) of this style has *no* leather facing, therefore it must be perfectly flat on its under face, as must also be the seat under it. The same flat conditions are required of the accelerator valve (97). The trailer valve (98) also requires perfectly flat bottom and true joint at its end that rubs against the tempo valve, or else it will not stop the motor when button R (p. 15) is pressed fully down.

Tests for Leaks in Tempo Valve—

Tests for leaks by paper or leather, and cures by file or sandpaper are as formerly described for ordinary tempo governor box. If the valve is not flat, it should be faced true by carefully rubbing it on sandpaper held flat on a perfectly flat block, face of a plane, marble table top, or looking glass. *Do not* run a file or sandpaper *over* a valve face, as you will round it instead of flatten. If the valve shows a rounded surface or a high spot or corner it is better to scrape the high part down first, then face off to finish, on any *flat* surface.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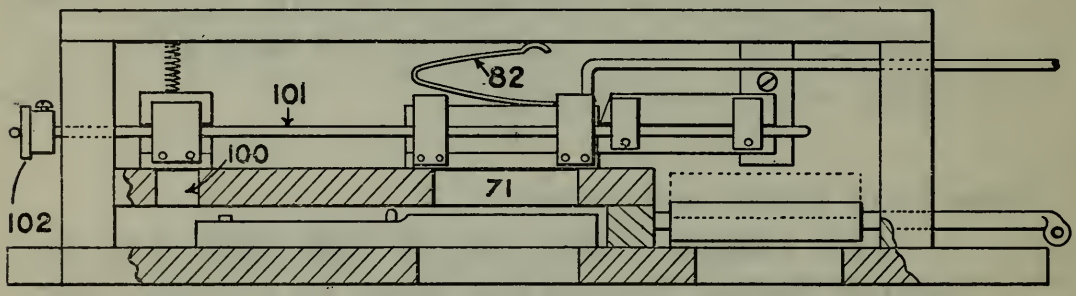
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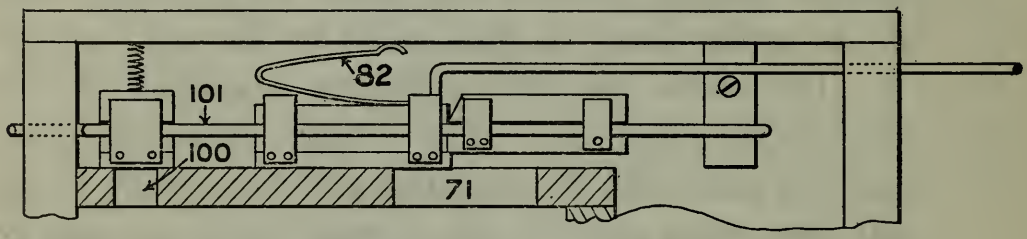
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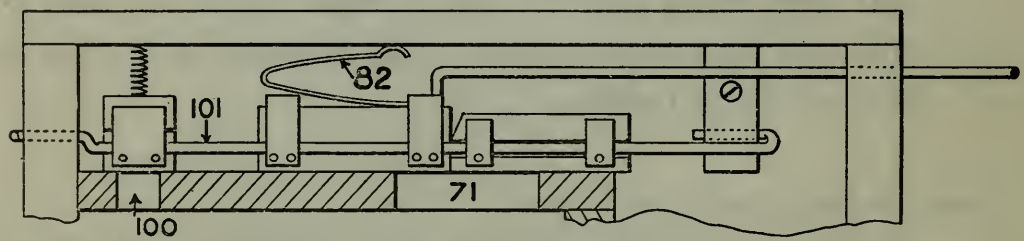
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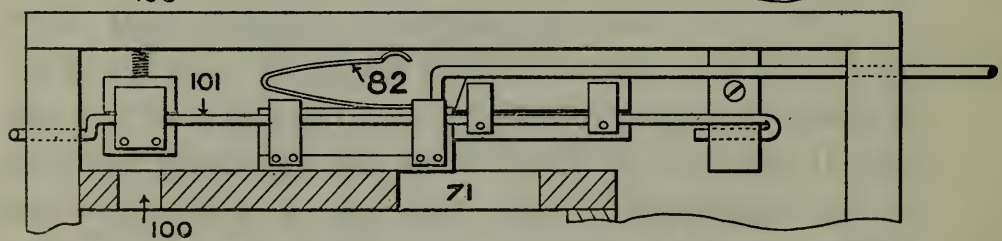
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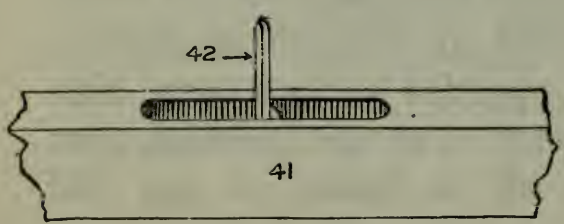
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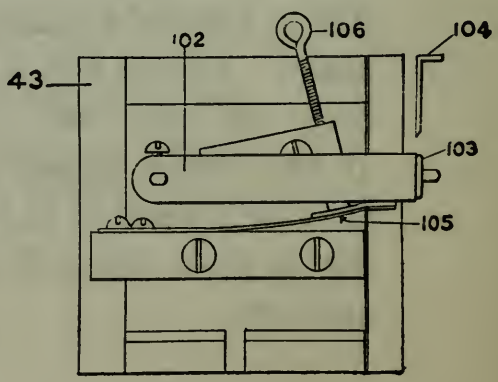
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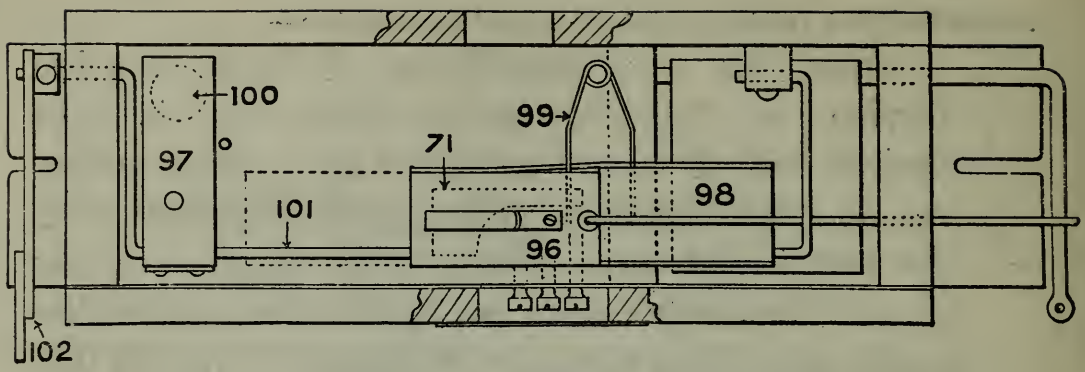
Interpretation Device—Operation and Regulation—

Operation and Regulation of Interpretation Device as follows: trailer valve (98) is held against end of tempo valve (96) by a small spring (99) so that the two valves slide together over the tempo slot (71). When tempo handle (42) has moved the tempo valve (96) to left and opened the tempo slot (71), a pressure on button R (p. 15) will lower trailer (98) to partially or wholly close the tempo slot (71) and *slow* or stop the running of the motor and music sheet.

Accelerator Valve (97) lies closed over an extra valve hole (100). When button A (p. 15) is pressed, it will raise this accelerator valve (97) and *increase* the speed of the motor and the music sheet.

Testing of Interpretation Device—

These Trailer and Accelerator Valves are moved up and down by a rocker wire (101) which is connected by arm (102), lever (103), and wire (104) to the push button R and A. A spring (105) holds up arm (102) to medium position when rocker wire (101) should be just ready to raise accelerator valve (97) but not crowd it up to start motor. This position is adjusted by regulating screw (106) at left of tempo box (43). Test this regulating when tempo handle is at left, pressing down button A, and letting it up *very slowly*, and see that motor stops at end of rise. Also test that the motor will start just as you commence to press slowly down on button A. Come as close to both tests as possible. With accelerator valve (97) and rocker arm (102) correctly set, trailer valve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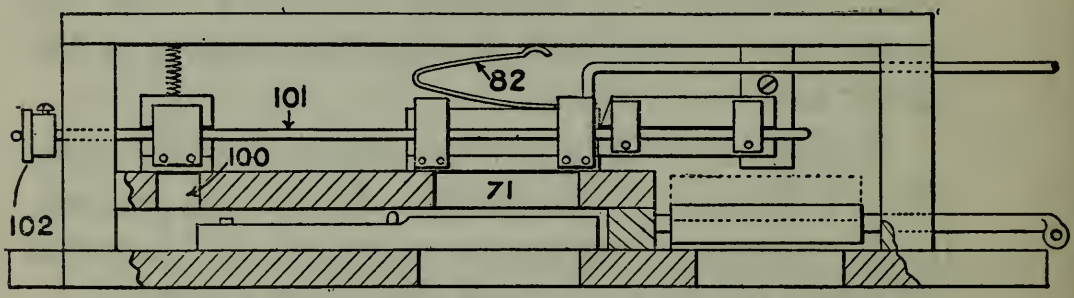
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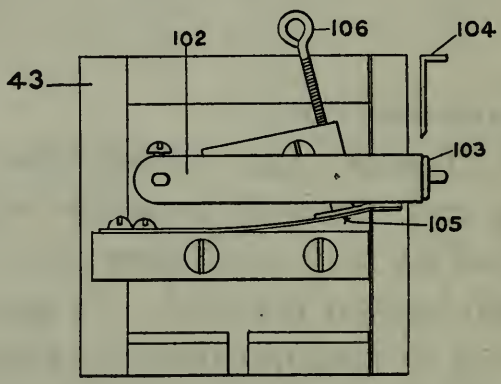
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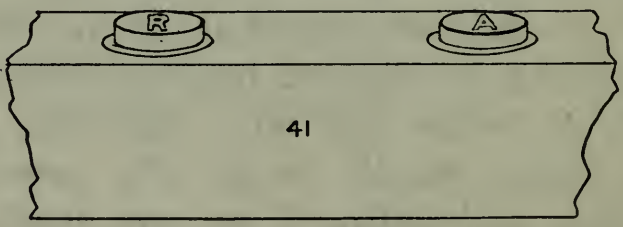
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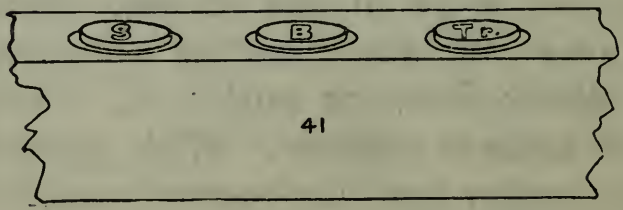
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(98) should have its front bottom edge 3/16 inch above the seat. Much less height will slow the regular speed of the motor.

Connections from tempo box to buttons R and A and tempo handle should be free working, but not so loose as to cause jerky motion.

Any squeaks can be stopped with *dry* powdered black lead (plumbago) in the cloth-lined bearings, and on wood above spring (82). Use machine oil or vaseline in joints when both parts are metal, as (102-103).

Expression Buttons—

Expression Buttons, S, B, T, when pressed down, lower spring valves below them under the keybed, which open valve holes which allow outside air to pass through tubes to the loud pedal and expression boxes.

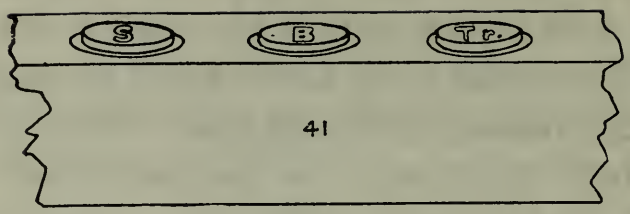
How to Remedy Troubles—

If a box does not work when its button S, B, or T, is pressed down, pull the small rubber tube off that box and if box then works, the trouble is in the tube, or in the valve or its hole under button S, B or T. Blow back through the tube while you hold button and valve down, and get the tube, etc., free until air will blow through.

If the box does not work when its small rubber tube is pulled off, the trouble is in the box itself. (See directions for same on page 23.)

Sticking Buttons—

If a button sticks down, it is from dirt wedged below it somewhere, or from swollen cloth in hole around button. Clean out the dirt, or file or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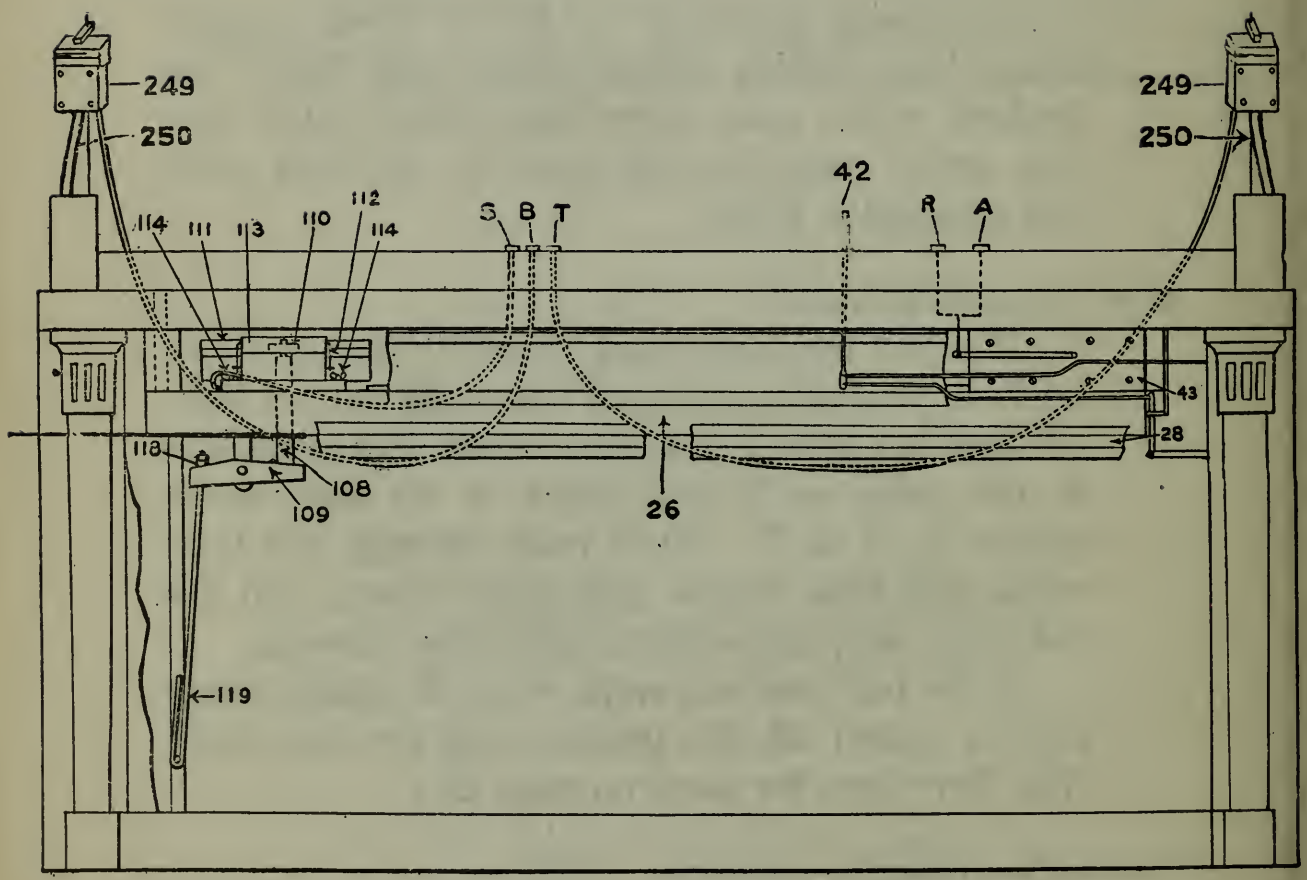
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cut away a little cloth. (Swollen cloth happens only in very damp places.)

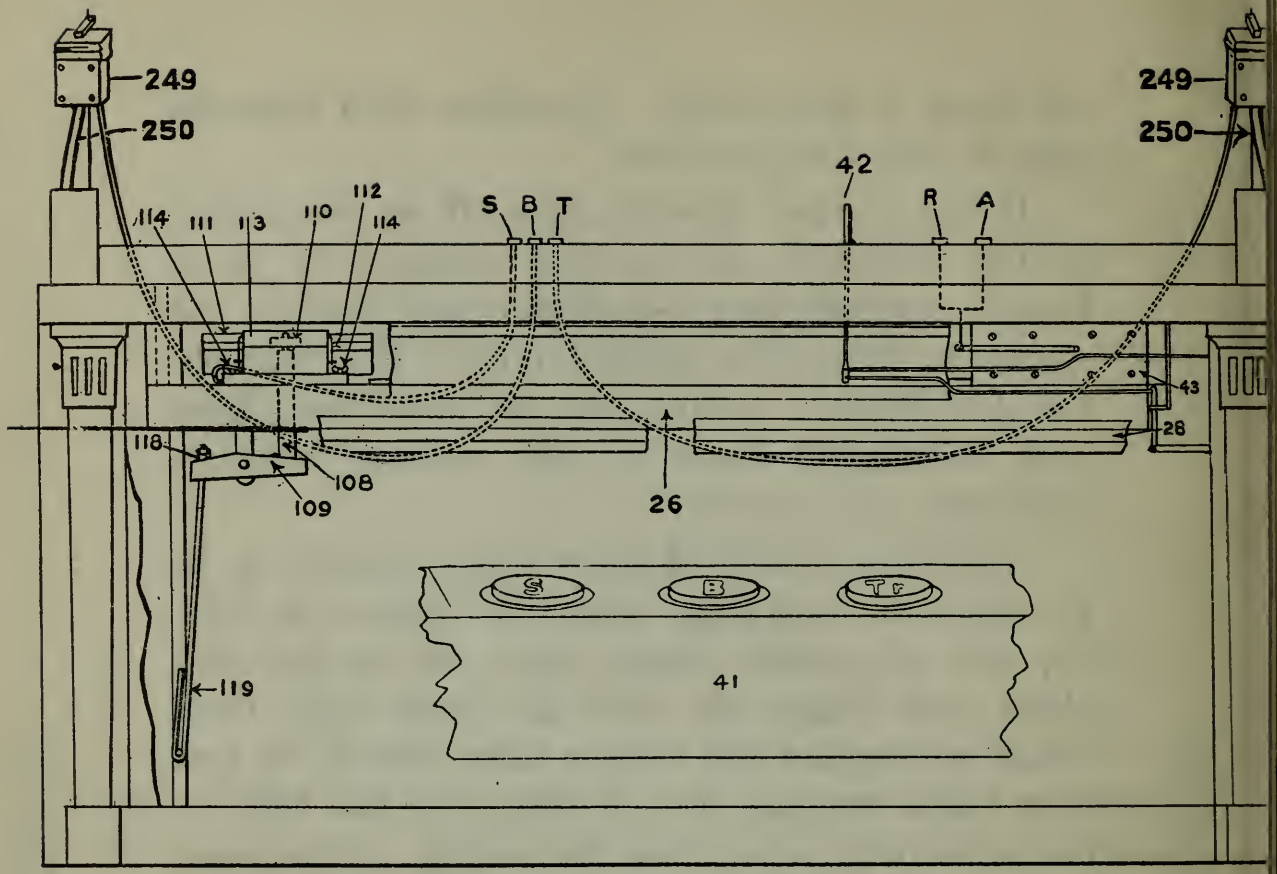
If the leather should come off an expression button spring, it can be best replaced by using French varnish (not too thick) and heating the spring to drive the alcohol out of the varnish. Put the French varnish on the metal and heat over an alcohol flame till the varnish bubbles, then apply the leather.

If the box of any of these three buttons, S, B, T, stays *on* (working) when its button is fully up, pull the small rubber tube off its box and place your finger tip over the brass tube from which you pulled the rubber tube, and if the box then stops working, the trouble is in the tube or the valve or its hole under the button. Blow back through the tube while the button is up, and stop any leak that you find, first pressing up on the spring valve under the button S, B, T, to learn if it does not close the hole by its own pressure. Dirt between the valve and seat is the probable trouble in such case.

If box does not stop off when you close its brass tube, there is leakage from looseness of that tube, or trouble in the box or connections thereto.

How to Take Out Loud Pedal Pneumatic—

Sostenuto or Loud Pedal Pneumatic is fastened on top of the bellows chest (26) near the left end. To take out: Raise pin of rod (108) out of hole in lever (109), unhook its upper end from arm (110) of pneumatic (111). Unhook wires (112) and remove muffler (113). Remove wing-nuts (114), lift front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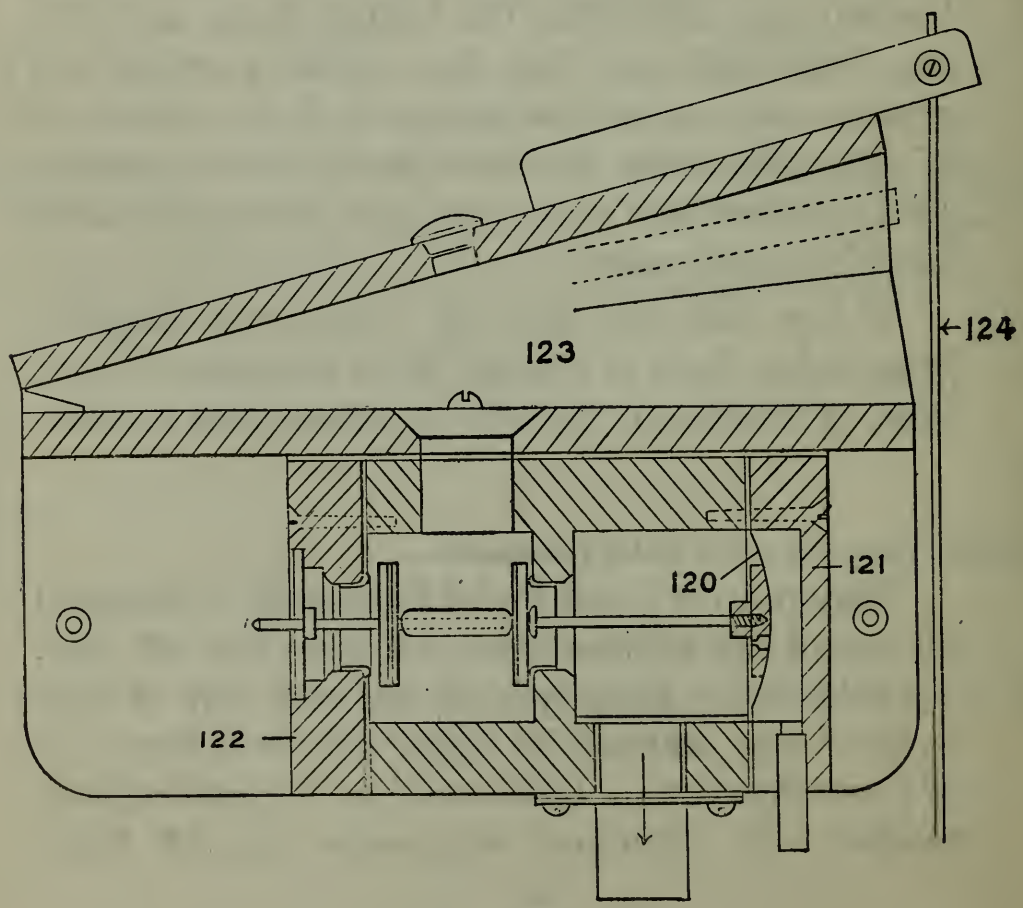
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of device free of their screws and pull forward and out.

How to Replace Same—

When replacing, see that pin at rear of whole device enters its guide hole at rear of bellows chest. Such removal is only needed when cleaning valve, or repairing long wear of pneumatic.

Valve is reached, cleaned and regulated the same as action valves, first removing muffler (113). See page 27, par. 3, etc. Pouch is reached by removing cloth seal from front of box, or by removing screws from under face of bed, after removing valves and valve rod.

Loud Pedal Pneumatic—Adjustment of Stroke—

Adjustment of Stroke is made by double nuts (118) on rod (119). These should be screwed down and locked so as to raise the moving board of the pneumatic (111) as high as it can go and leave sufficient freedom that the dampers of the piano action will return to the strings and fully stop the tone after a heavy bass chord is struck with foot pedal of the piano down and then let up.

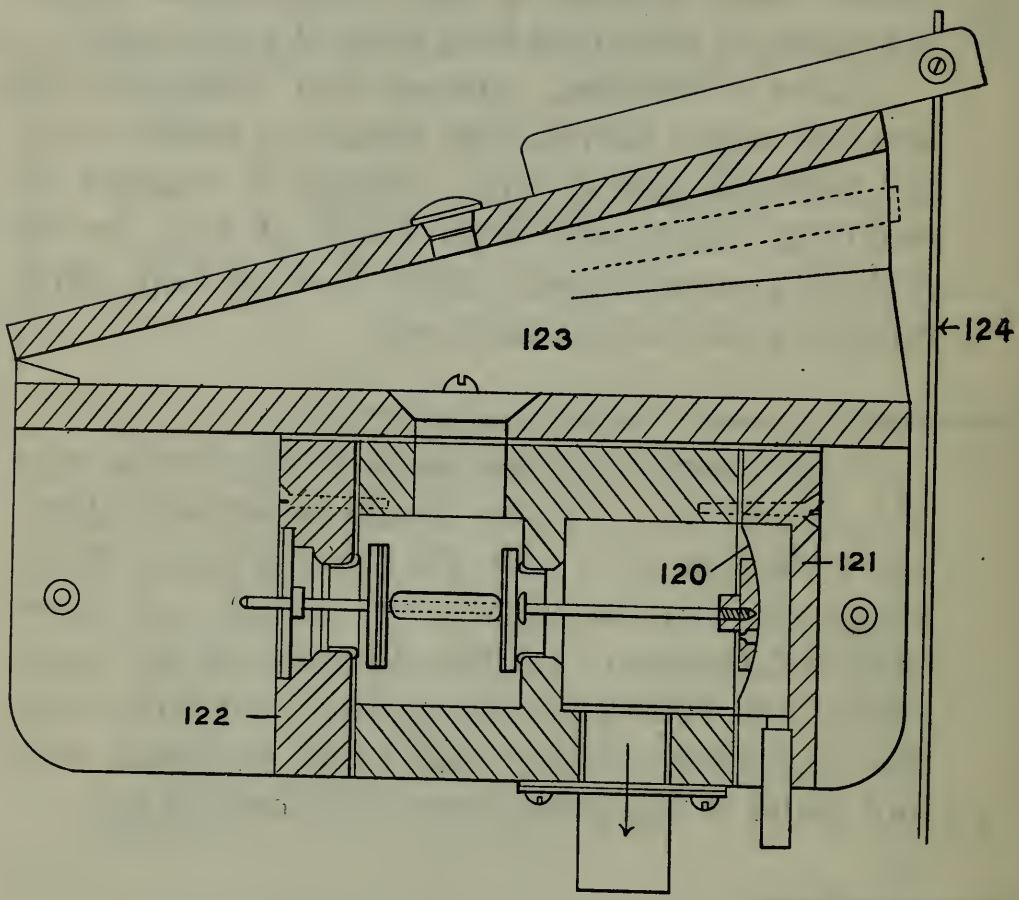
Expression Boxes—

Expression Boxes (249) are controlled from button B and T in the keyslip (41).

Valve regulation, leaks, etc., are to be cared for the same as the main valves of the player action—directions page 27.

Removal and Replacing of Pouch—

Pouch (120) is on rear board (121) of box, which board should *not* be removed *until after* the


123
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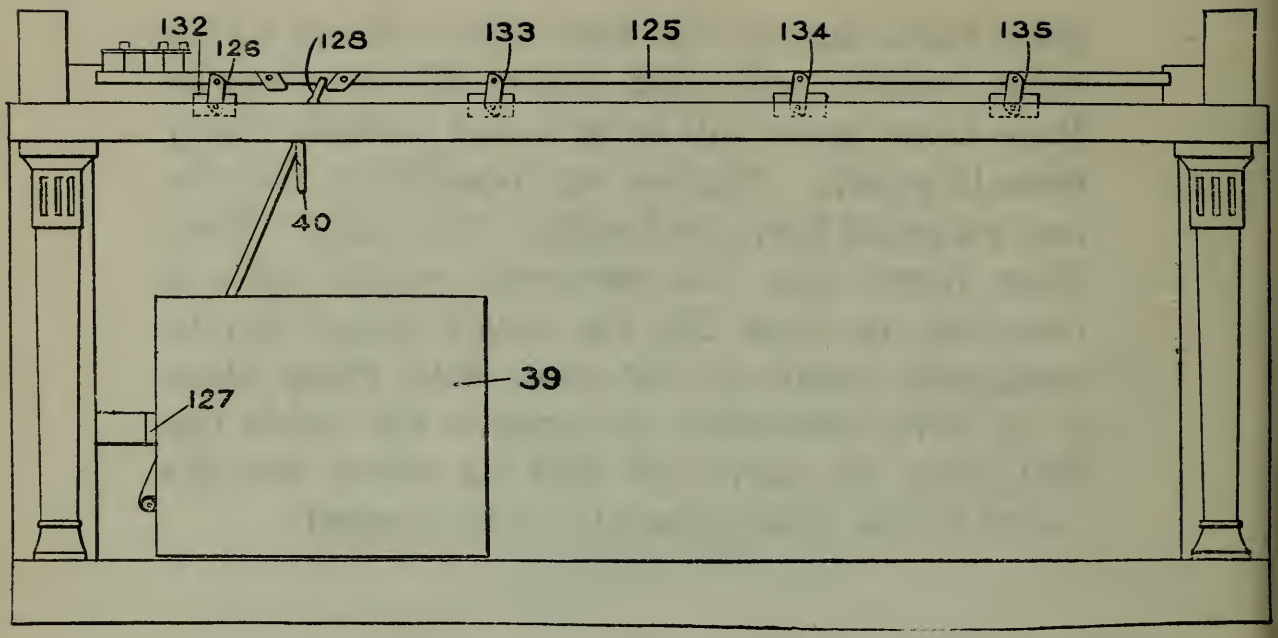
front valve cap (122) has been taken off and all the valve leathers and discs taken off, as otherwise these latter parts will be spilt and possible injury done to pouch. Replace rear board first, then insert valves at front, and replace valve cap. When these boxes have the removable valve rods, as described on page 29, the pouch board can be separately removed, but even with those boxes it is more convenient to remove the valve cap first, then the valve rod with its valves and the pouch board, and replace the pouch board.

How to Check Down Throw of Pneumatic—

Checking of the Down Throw is not by setting the rod (124) to striker (123), but with a check block on the hammer rail which should stop the hammers of the piano at 7/8 inch from the strings when striker (123) goes down. The arm of the striker (123) should be set to the rod (124), so that when the piano rail is at rest and the striker is thus raised, the cloth of the striker is *not* tightly drawn, as such tightness will cause a snapping noise when striker returns from a stroke.

How to Cure Slowness of Operation—

If any Slowness of Operation, first disconnect rod (124) at top and try if the piano rail is working freely. Look for swollen tight hinge joints, of the sub-hammer rail rubbing rail at its top edge, or against the end of the other section. If no trouble at this point, look over the valve work of the box and tube connections.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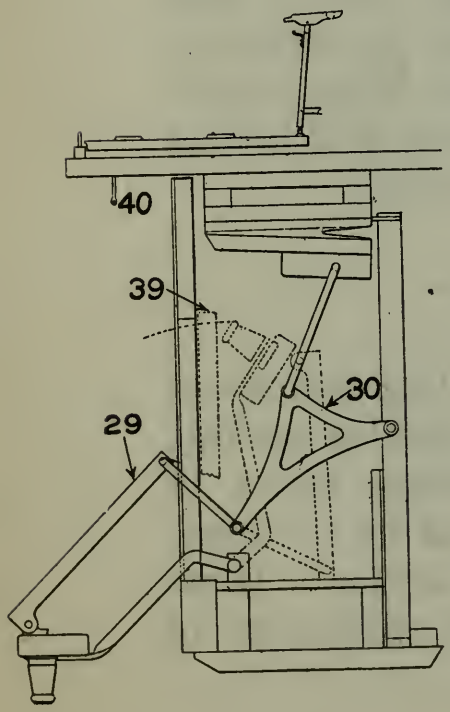
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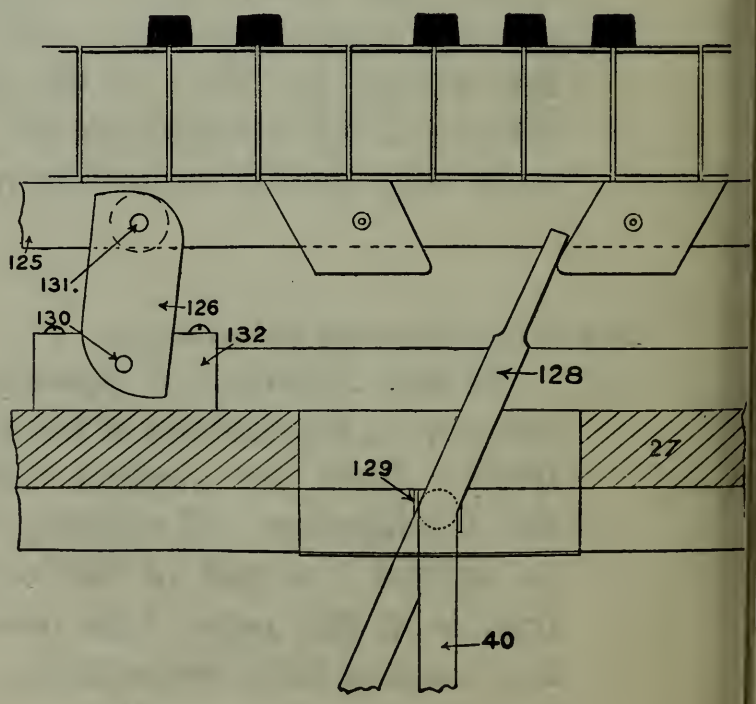
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Key Lock—Working of—

Key Lock is worked by the handle (40) which opens the lower slide door (39) and at the same time locks the keys from moving during operation of piano action from the music roll. When the handle (40) is thrown to the left and slide door is against bumper (127), the key lock bar (125) should hold all the keys a little raised from their natural level, with the toggles (126) 1/16 inch to the right of straight up. Any error in this can be corrected by adding to or removing some of the left bumper felt (127), if the throw of door will permit, or, if not, by bending the upper arm (128) of handle (40) to right or left where it engages the key lock. The motion of handle (40) and bar (125) to the left is so much more than necessary to free the keys, that no trouble is likely when the handle is thrown to right to close the door.

Key Lock—Squeakiness and Stiffness—

Any Squeakiness or Stiffness may be cured by freeing or dry blackleading cloth bearings (129) of handle (40). No grease should ever be put on cloth bearings. Use black lead and tallow (or vaseline) where the toggles (126) of the key lock bar work on the screws (130) or machine oil on the felt washers of the pins (131) that go into the rail (125) to oil those pins. Squeaks in the key locks with metal toggles should be remedied with machine oil or vaseline.

Swelling of the wooden toggle blocks of the key lock may cause sluggish action of the slide door, which is cured by loosening of the toggle block screws (130).

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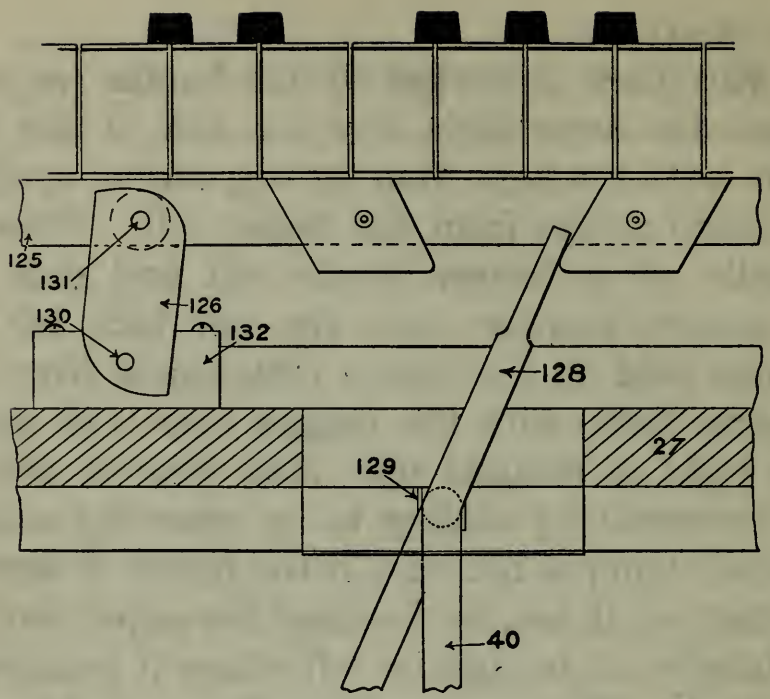
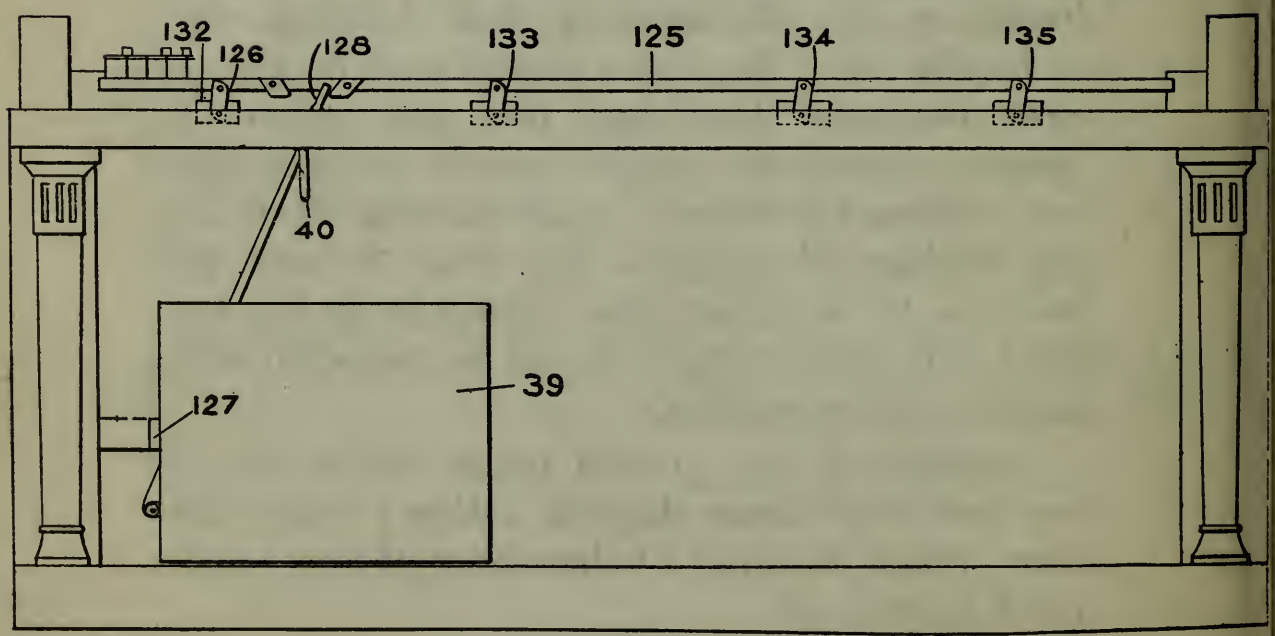
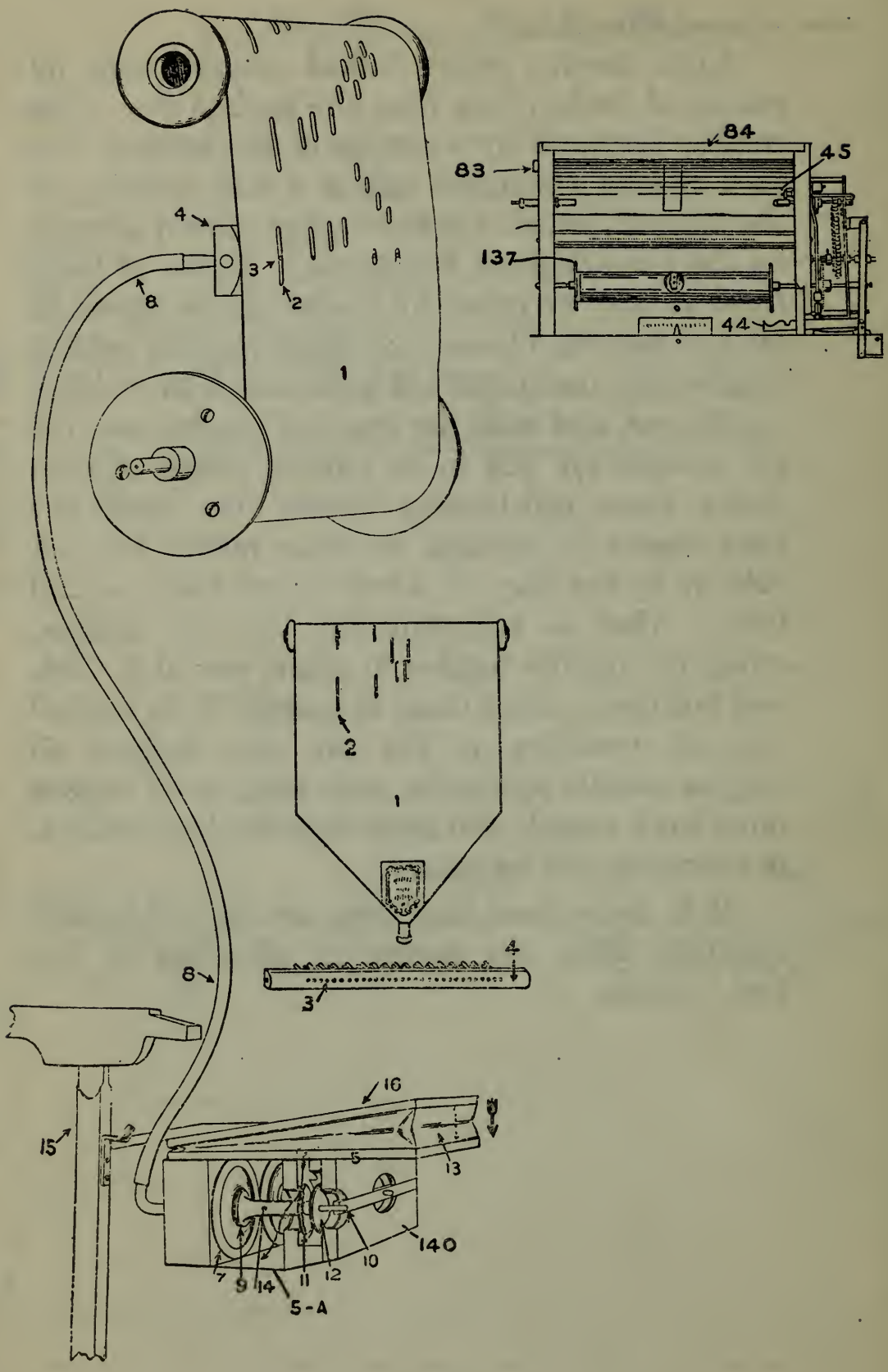




How to Remedy Moving Keys—

Keys moving when locked require cure by raising of the key lock from the keybed (27). This trouble is caused by a change of the keybed, and such change sometimes makes a stiff working of the keylock, which will show when moved directly by the hand without handle (40). Either of these troubles may be cured by loosening the screws of all the bearing blocks (132) throwing the middle toggles (133, 134) to the left to be free from holding up the bar, and with the two end toggles (126, 135) set *straight up*, put in or remove pieces of card under these end-bearing blocks (132) until the keys placed in position at those points are just held up by the bar (125) a trifle above their natural level. After so adjusting the two end toggles, swing the middle toggles to place, one at a time, and put cards under them to exactly fit to keybed without crowding up the bar (125), keeping all toggles *straight up* during such test, as all toggles must work exactly the same with the bar straight, or cramping will be caused.

It is understood that keys are in well-leveled condition when any testing or adjusting of key lock is made.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5-A

TESTING AND REGULATING PLAYER ACTION

Fine Testing of the Player Action can only be properly done with the *piano action in good regulation,* as the player action, like the human fingers, is limited by what results the piano is capable of.

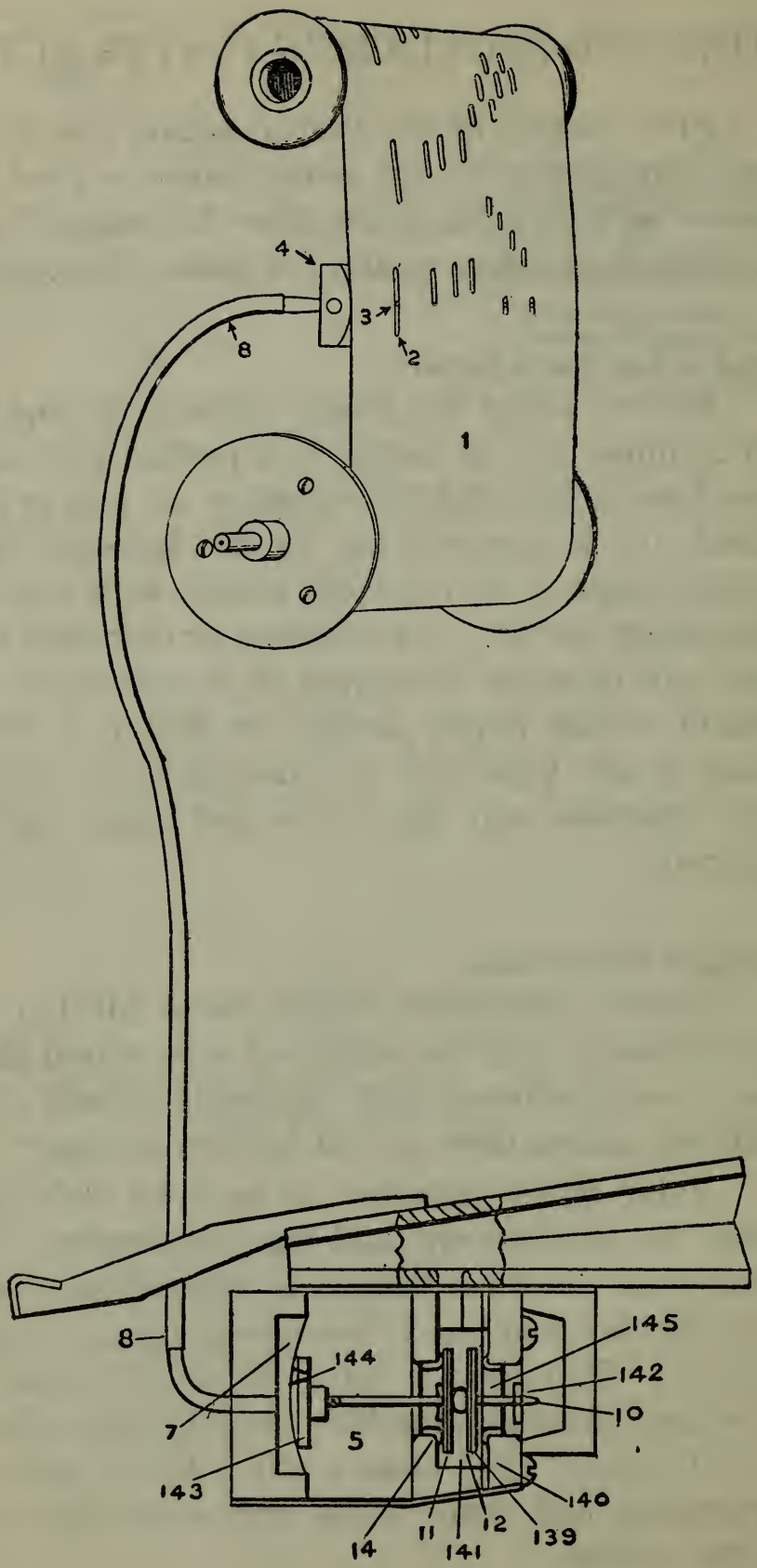
Preparing to Test Player Action——

Before Testing the Player Action, be sure that your music roll or tester is a perfect one and in good condition, and the regulator (45) and cylinder head (137) is properly set for the holes (2) of the music sheet (1) to correctly match with the holes in tracker bar (4). An incorrect or damaged music roll will often be the cause of a customer's complaint of the player action, so that it is always best to ask what roll of music gave the trouble, and examine and try it the first thing on your arrival.

Regulating of Valve Motion—

Proper *Regulation* of the Valve Motion, etc., is necessary, and the standard here stated should be closely followed, but regulation should not be altered, unless there is real fault in playing.

Valve throw (motion) to be 3/64 inch, measured by the forward and back movement of the valve rod (10) when bellows is pumped and hole (2) in paper is opened and closed over hole (3) in tracker bar (4). Too great a valve throw will cause slow working of notes, especially repeats and trills, and wind noises. Too close a valve throw will cause uncertain and weak notes, and even silent notes after a time.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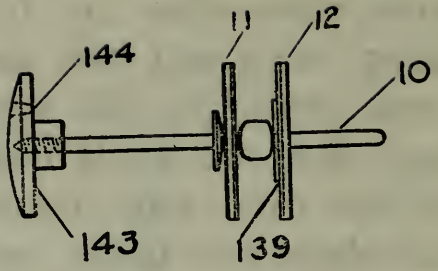
Regulating of valve throw is done by putting in or taking out the paper discs or chips (139) that are behind the outer valves (12) similar to piano key regulating. "Tweezers" are handy for this work. Remove valve caps (140) to reach valves. When replacing valve cap (140) see that all the valves (12) rest evenly in the bottoms of their chambers (141), slide the guide holes (142) of the cap on to *all* the valve rods (10) of that section, then raise to place and fasten screws. This is made easier by putting suction on the valves. Pull all rods (10) forward after working on valves.

Preventing Loss of Air and Draggy Playing—

Inner Valves (11) must seat surely and freely against their seats (14), otherwise loss of air and "draggy" playing will result. Any leakage may be heard by a listening tube of rubber having a ⅜-inch or a ½-inch hole or bore and not over 12 to 18 inches long, one end to the ear, the other to the valve. (Before pumping, listen to the natural sound of the tube itself). If any leak, it is usually from some small piece of dirt behind the valve (11), which should be carefully picked off the leather with a knife point.

Removal of Inner Valves—

The Inner Valves (11) are best removed by a small wire having its end bent L shape to hook back of the valve and fully across it; or by large "tweezers" that will take hold outside the two edges of the valve.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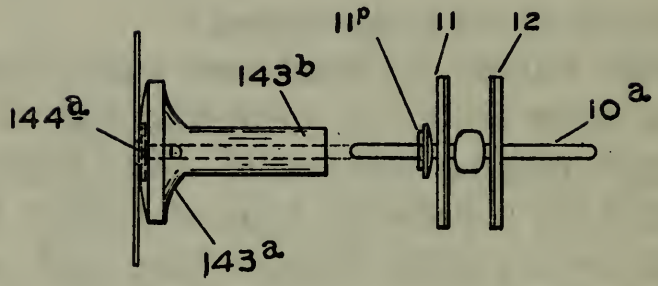
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143b
11p
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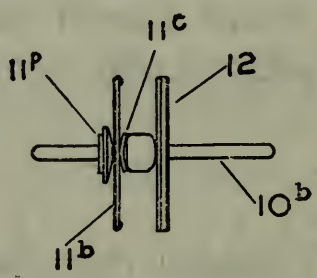
10a
143a


11c
11p
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10b
11b

Removable Valve Rods—

With the later and present makes of "Manualos," the valve rod (10a) is made loose in and *removable* from the stem of the button (143a) with the valves (11) and (12) carried on it, so that cleaning of inner valve (11) may be done without removing either valve (11 or 12) from the rod (10a), and any regulating of the valves can be done with the rod and valves out of action.

"Caution"—Be careful not to try to pull out a rod (10) of the screwed-in style, as such pull would spoil the pouch. The removable style rod will come out freely. If the rod does not start to come out easily, it is a screwed-in one, and must not be pulled. Both styles of rod (10) and (10a) are shown in the pictures on opposite page; also another style of rod (10b), on which the inner valve (11b) is covered with thin dustproof leather and has a check collar (11c) in front of such inner valve (11b) to prevent the rod (10b) from slipping in the thin leather of the valve. This valve never needs any removal from the rod (10b), which the collar prevents.

N. B.—With the removable valve rods (10b), the return vents or bleeds (144a) are at the rear of the central hole in stem (143b), and can be reached through the hole of the stem (143b) when the rod (10b) is removed.

How to Remove Fine Dust from Valves—

Fine Dust, if in old instruments or special places, can be removed from the valve leather by a fine small paint brush (camel's hair pencil cut

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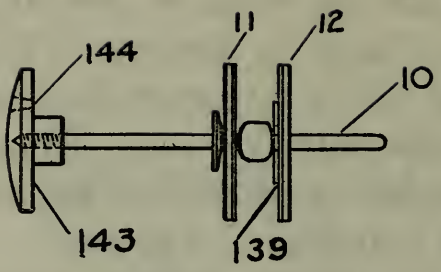
Be certain whether valve rod is of screw style (10) or removable style (10b).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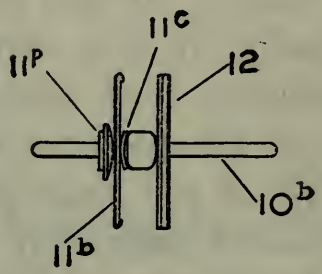
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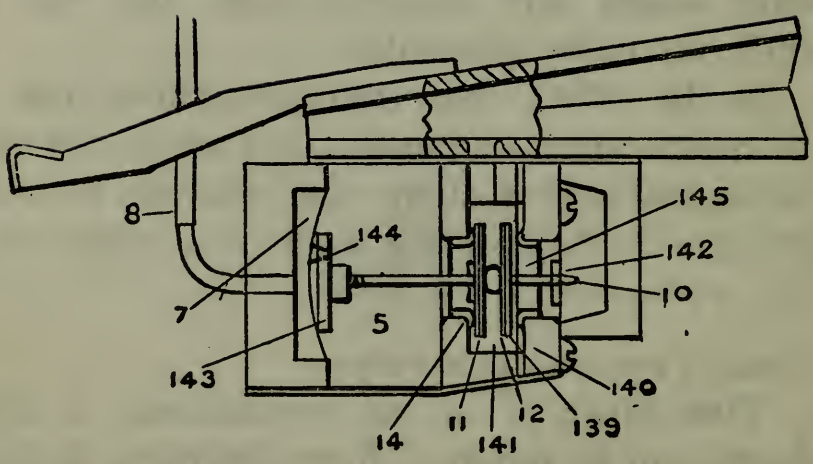
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short), being careful to keep the leather smooth by brushing it in the *one* direction in which its fibres lie.

Avoid Crowding of Inner Valves—

Crowding of the Inner Valve (11) by over-close regulating of valve rod (10) to button (143) of pouch leather (7) will cause leakage or draggy playing. There should be freedom of about 1/32 inch of the rod forward and back when the inner valve (11) is held tight to its seat, and the rod is moved by the fingers or pliers. Or, while holding the inner valve tight to its seat, hold a small, short rubber tube to the hole in the tracker bar belonging to that valve, and with the mouth and cheeks first suck and then blow into the tube, feeling the free motion of the pouch by the movement of air in your cheeks. Too much free motion will "cheat" short notes, too little will "slur" repeats and trills, and cause leakage either then or when damp weather shrinks the pouch leather.

Regulating of Button—

Regulating of Button (143) to valve (11) is by carefully screwing rod (10) in or out while moderately pressing the rod in to avoid loosening button (143) from pouch (7) to which it is attached, and on which vent (144) depends.

How to Remedy Crowding of Inner Valve—

Crowding of the Inner Valve of a removable style valve rod (10b) can be cured by removing the card punching (11p) from the rear of the metal collar of the rod. With the thin leather valve

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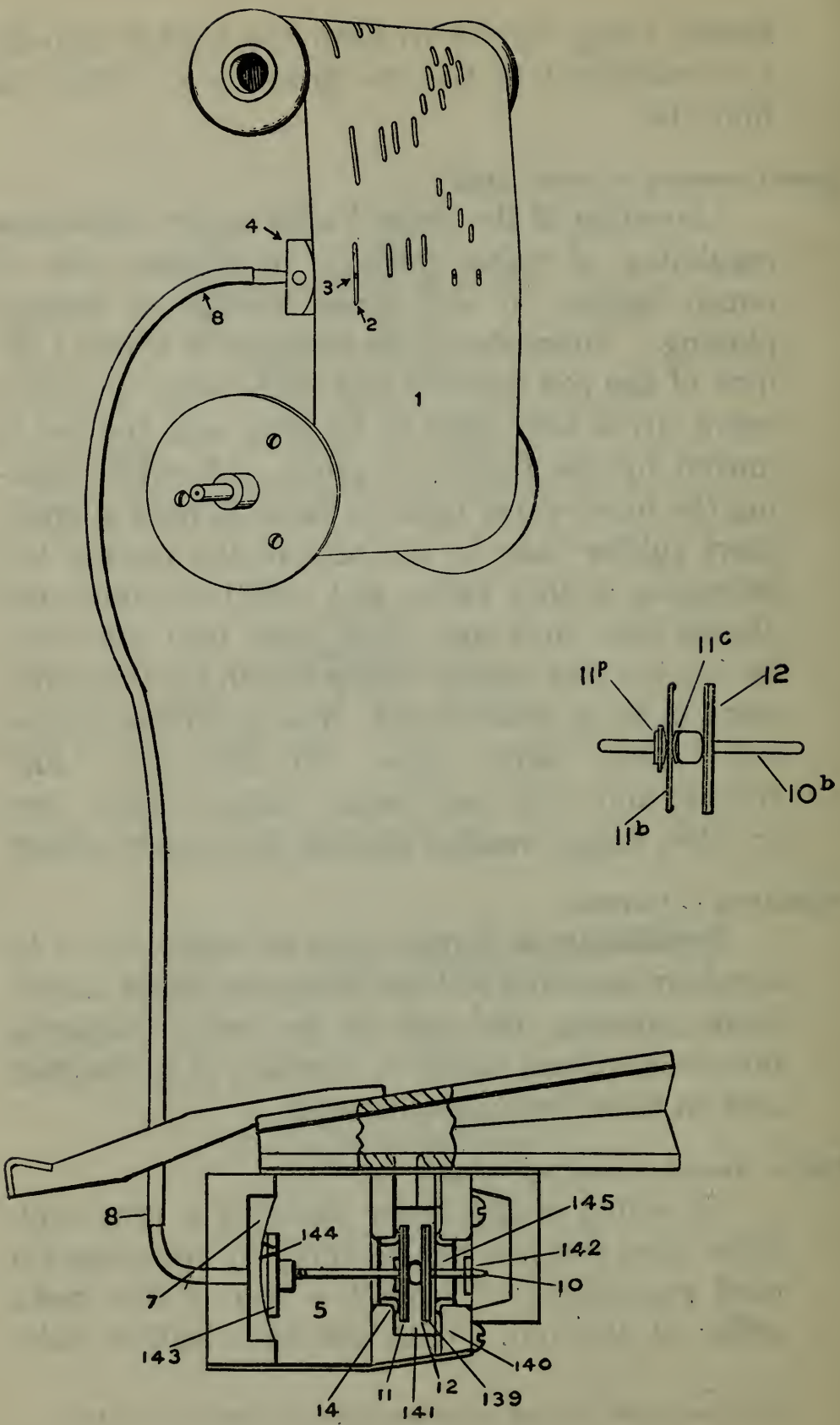
Be certain whether valve rod is of screw style (10) or removable style (10b).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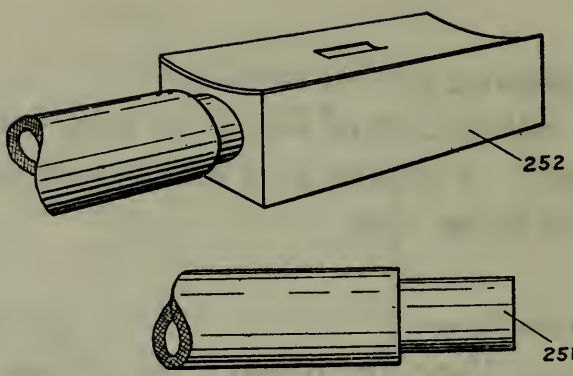
(11b), the free motion must be tested by a tube to the tracker hole as described above. The thin leather valve (11b) can be held to its seat by pressing in on the rod (10b), but this can not be done with the other style valve.

How to Stop Squeaking of Valve Rods—

Any Squeaking of Rods (10) may be stopped by pencil lead, or tallow and black lead polished into the guide holes (142).

Working of Return Vent—

Return Vent or Bleed (144) allows the return motion of the pouch (7), rod (10) and valves (11, 12) when a perforation (2) of music sheet (1) passes away from an aperture (3) of tracker bar (4). The vent hole (144) *does not suck back anything.* It simply connects the inside or socket of pouch (7) with the air of chest or chamber (5), so that the inward motion of valves (11, 12) from outside air pressure through hole or port (145) can press back the rod (10) and button (143) and force or pump the air out of the inside of pouch (7) through the vent hole (144) to the chamber (5). If there were no vent hole (144), the pouch (7) could not move back because of the air blown into it during its previous inflation, so the vent (144) must be provided to allow the return action as described above. If this return vent (144) were too small, the playing of a note would end too slowly. If too large, the playing would miss, or start too slowly, and would end too quickly. The "Manualo" standard for this return vent (144) is a hole the size of a No. 57 drill.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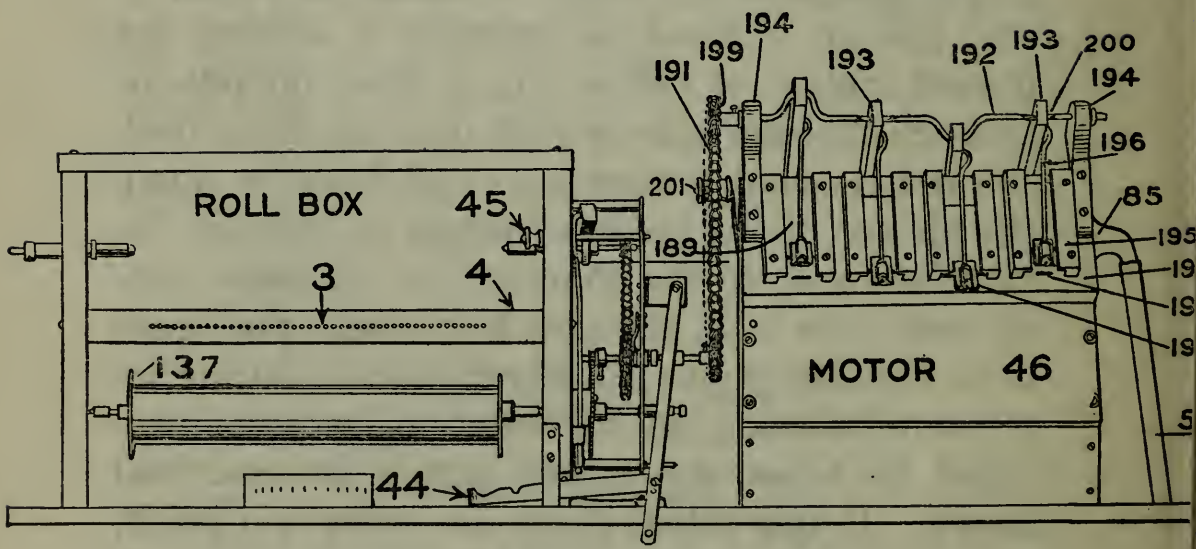
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Dust in Vents—

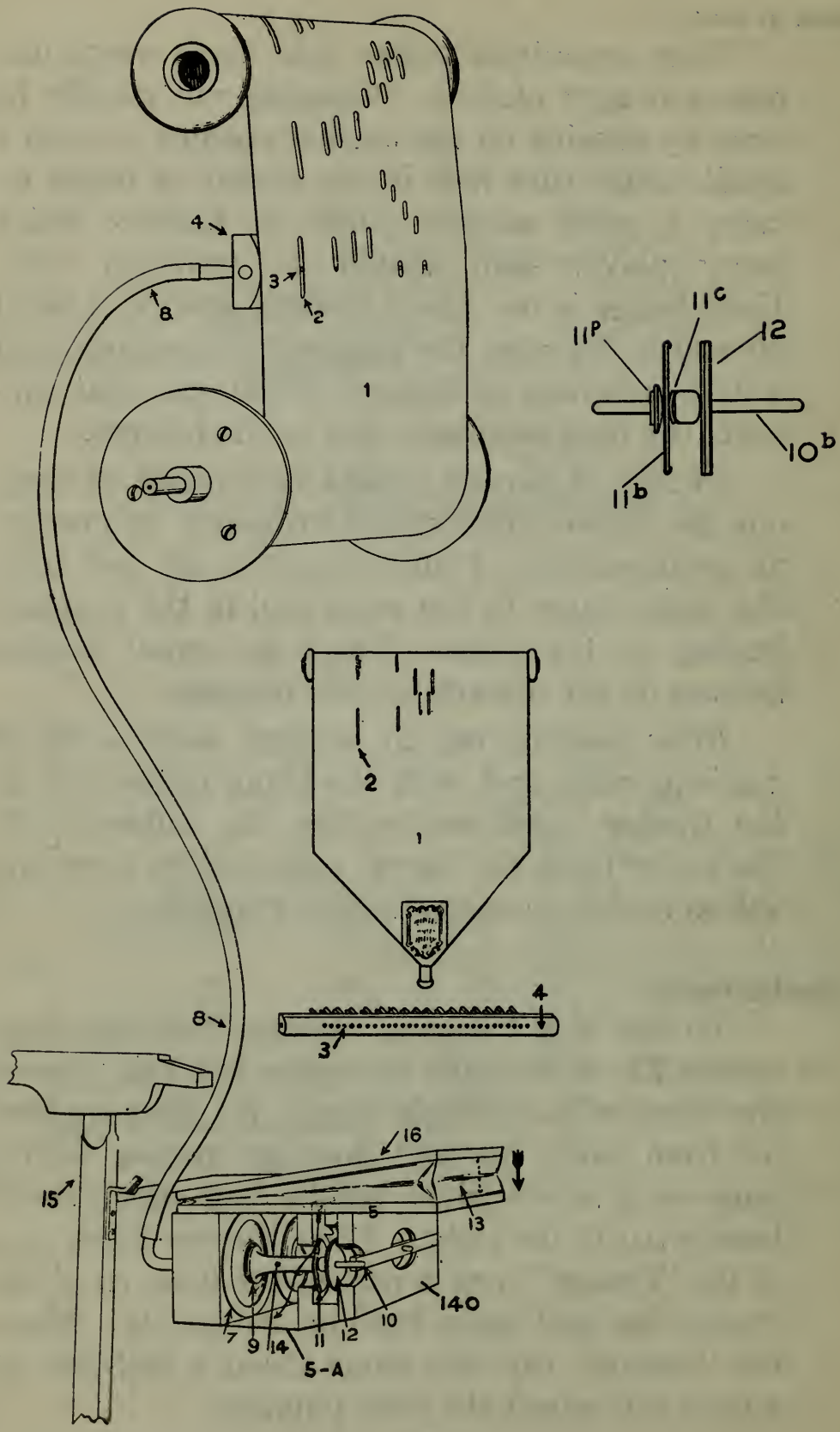
Dust sometimes draws into these vents and causes draggy playing. Cleaning can usually be done by sucking on the tracker opening (3) with a small rubber tube held in the mouth, or better by using a small suction pump or bellows which every player man should be provided with. Even better is our latest cleaning device, a small air cap to lay over the tracker bar openings, and a 9/16-inch hose to connect to the hose that connects the bass expression box to the bellows.

Owners of players should be advised to clean out the tracker connections frequently to prevent an accumulation of dust from the air and from the music paper in the vents and in the channels leading to the vents. There are small suction bellows on the market for this purpose.

After cleaning out by suction, start a roll of music as usual and, with the blank paper over all the tracker holes and suction on, suddenly lift the paper from the bar at each end to force the valves back into normal playing position.

Cleaning Device—

To use this Cleaning Device—Pull the hose (250) (p. 23) off from the expression box, and connect the "cleaner" hose nipple (251) to it. Remove hose (58) from motor (46) and close its opening with a plug or a screw-driver handle and move reroll handle (44) to the right. Place the cap block (252) of the "cleaner" over a part of the holes (3) of the tracker bar and pump hard on the pedals. Move the "cleaner" cap (252) along about a half-inch at a time and repeat the hard pumping.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Paper Lint in Tracker Bar—

Where new music rolls are being used, much fresh paper dust or lint is rubbed off and sucked into the tracker bar openings, and calls for good pumping out. Sometimes small paper chips from the cutting of the music paper will stick in the tracker holes and require removal, as they interfere with the free operation of the notes.

How to Remove Dirt in Old Players—

An old player, or one in which there is an unusual amount of dirt, should have its tubes (8) removed at their lower ends, and be blown through from that end and from tracker bar openings (3) to clear out the dust that has gathered in the tubes. Such blowing will remove paper chips from the tracker bar.

How to Do Specially Thorough Cleaning—

In a few cases, where an unusual amount of lint or dust has accumulated in the pouches, so that after ordinary pumping out and then playing a music roll, the vents or bleeds again give trouble, from the dirt sucking back into them, a *special* cleaning can be done as follows, but *only* on the players having the *removable valve rods* (10b). Remove player from piano, and slip all the rubber tubes off from the nipples at their lower ends, but do not pull the tubes out of their guide rail, as that will cause delay in reconnecting the tubes to the nipples. Now lay the player action flat on its back, placing something under each end to keep the player fingers from touching the floor or

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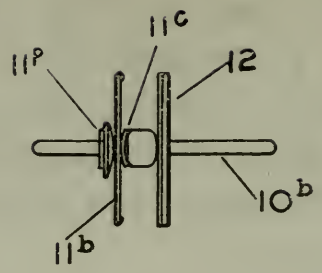
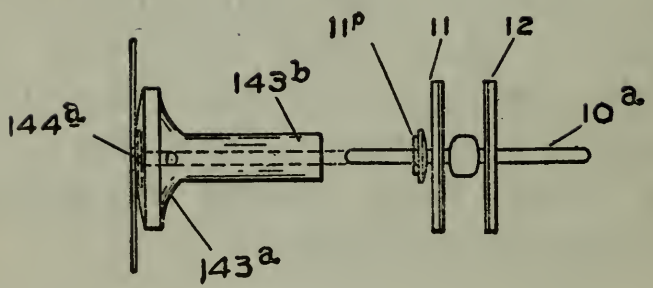
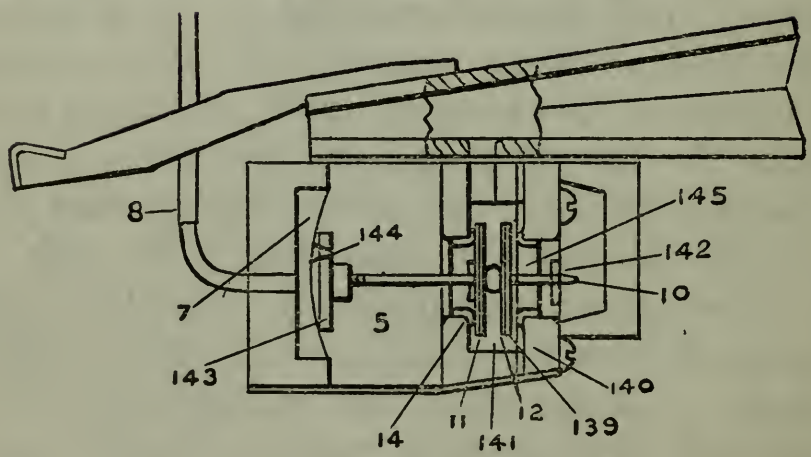




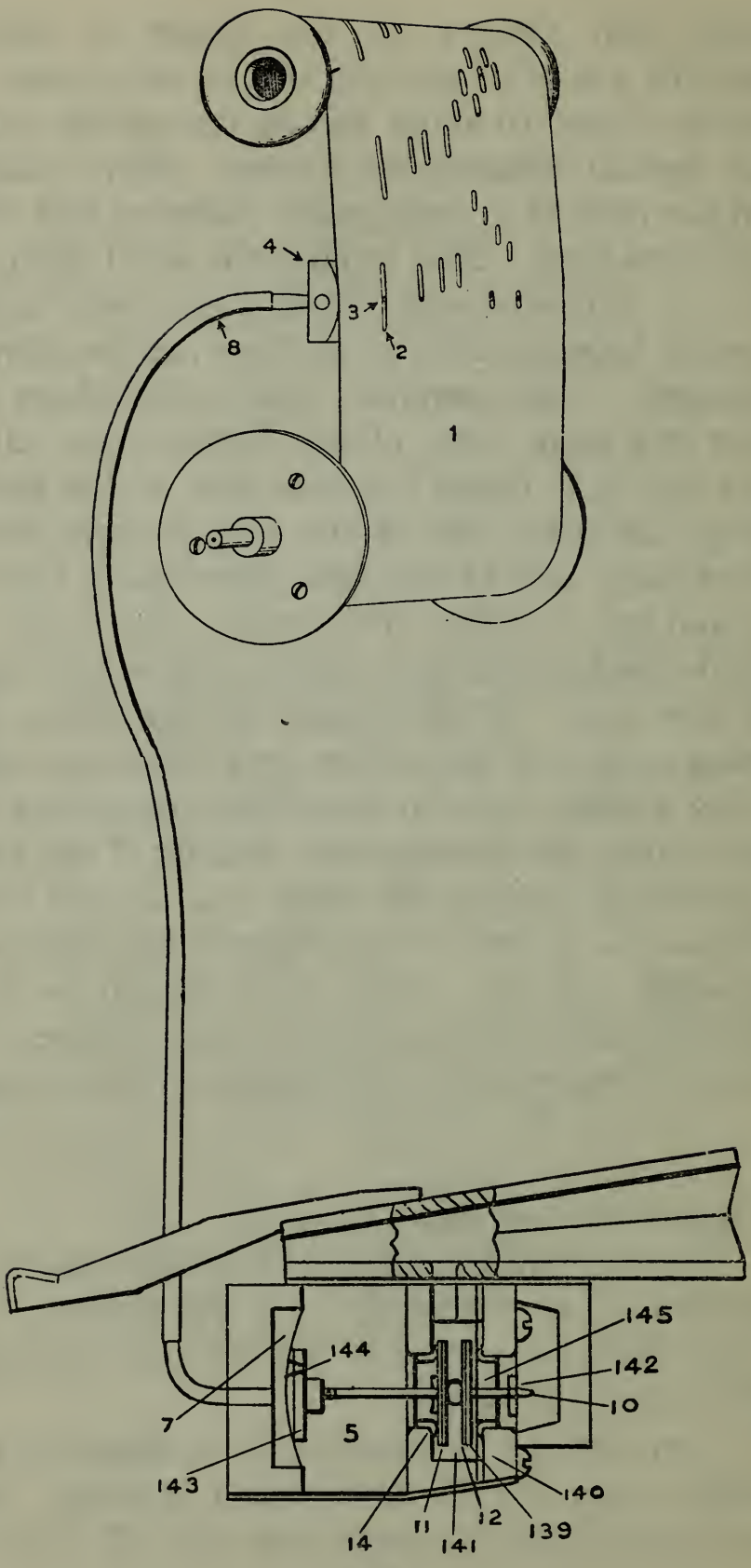


table, and remove *all* the covers or mufflers and the pieces or sections of the valve caps (140) *one at a time,* to avoid mixing the valves, and do the special cleaning as follows: Have ready a rubber tube of ¼ inch inside diameter and about 18 inches long. Now remove the small valve rods (10b) of that one section and place them in their correct holes in the cap so they can be correctly replaced. Then carefully shove the rubber tube over the stem (143b) of the button (143a) all the way on so it closes the side hole of the button. Have the other end of the tube in your mouth, blow hard, and at the same time shake the stem in and out rapidly. This loosens up all the dirt inside the pouch and it is blown out of the nipples at the rear. If the player is *very* dirty, after going once over one section, give the player action a few sudden jolts to loosen any remaining dirt, and repeat the blowing and shaking of the stems. Do not fail to clean the vents (144a) of each section with a No. 57 drill or wire *before* doing this special cleaning, and the rubber tubes should be blown through from lower ends and from tracker openings before replacing these tubes on their nipples.

How to Remove Dirt from Return Vents—

Return Vents (144) can be seen and reached by removal of the valve cap (140) and valves (11, 12), these vents (144) being in the buttons (143) just to the rear of the valves.

Any dirt can be removed by a needle or a fine wire, and a No. 57 drill passed through. If by any cause a vent is larger than No. 57, it can be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corrected by putting a little shellac in it, letting dry, and then cleaning out with a No. 57 drill. *Do not* change return vent (144) until you have regulated the valves, wires, etc., made sure the tubes (8) and their nipples, are tight, and that the button (143) is tight to the leather pouch (7) around the vent (144), and there is no accidental hole in the leather from any slip of a regulating wire. The No. 57 vent is a carefully determined standard, balanced to tracker hole (3), pouch (7) and valves (11, 12).

Effects of Leakages—

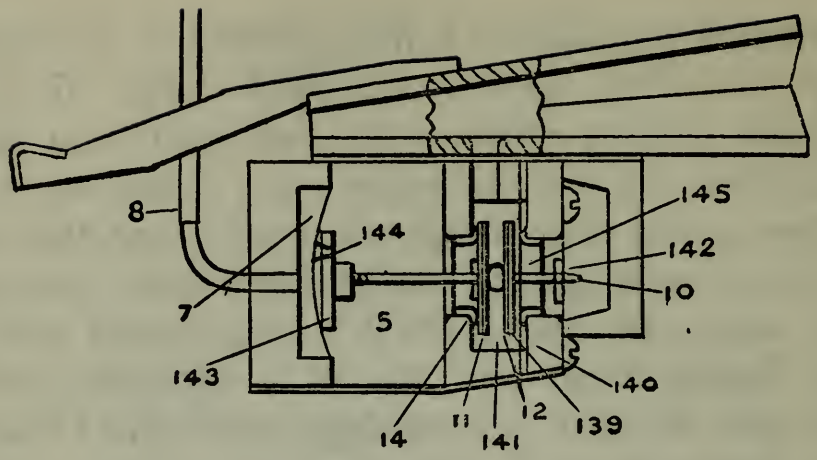
Any Leakage from the outside air connecting to the inside of the pouch (7) will cause action as if the vent (144) were too small, causing slow return of note. If very great, will bring on the note, or prevent its return.

Any leakage from the air of the chambers (5) connecting to the inside of the pouch (7) will cause action as if the vent (144) were too large, causing hesitating starting of note, too quick ending of notes, missing of short notes, or failure of note to sound at all.

The careful construction of the "Manualo" makes unlikely any serious trouble, much of the information just given being only to give tuners a thorough understanding of the player for help where an instrument has met with an accident at a great distance from a Baldwin representative.

Opening of Chests—

Only a serious *damage* to player, as by water, mice, etc., should make it necessary to open the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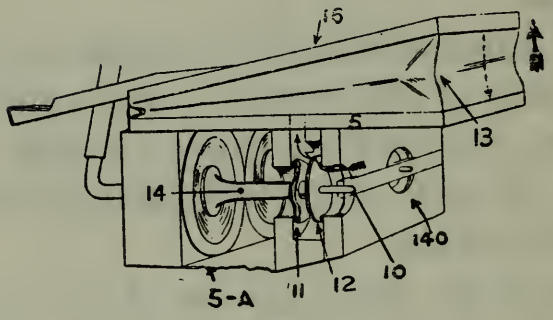
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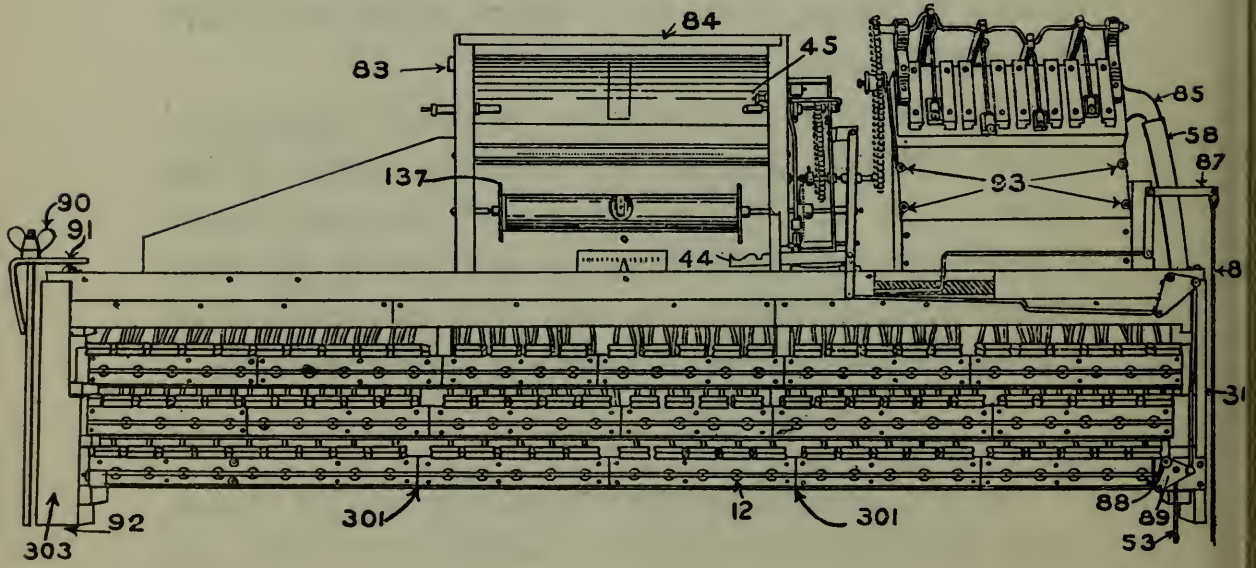
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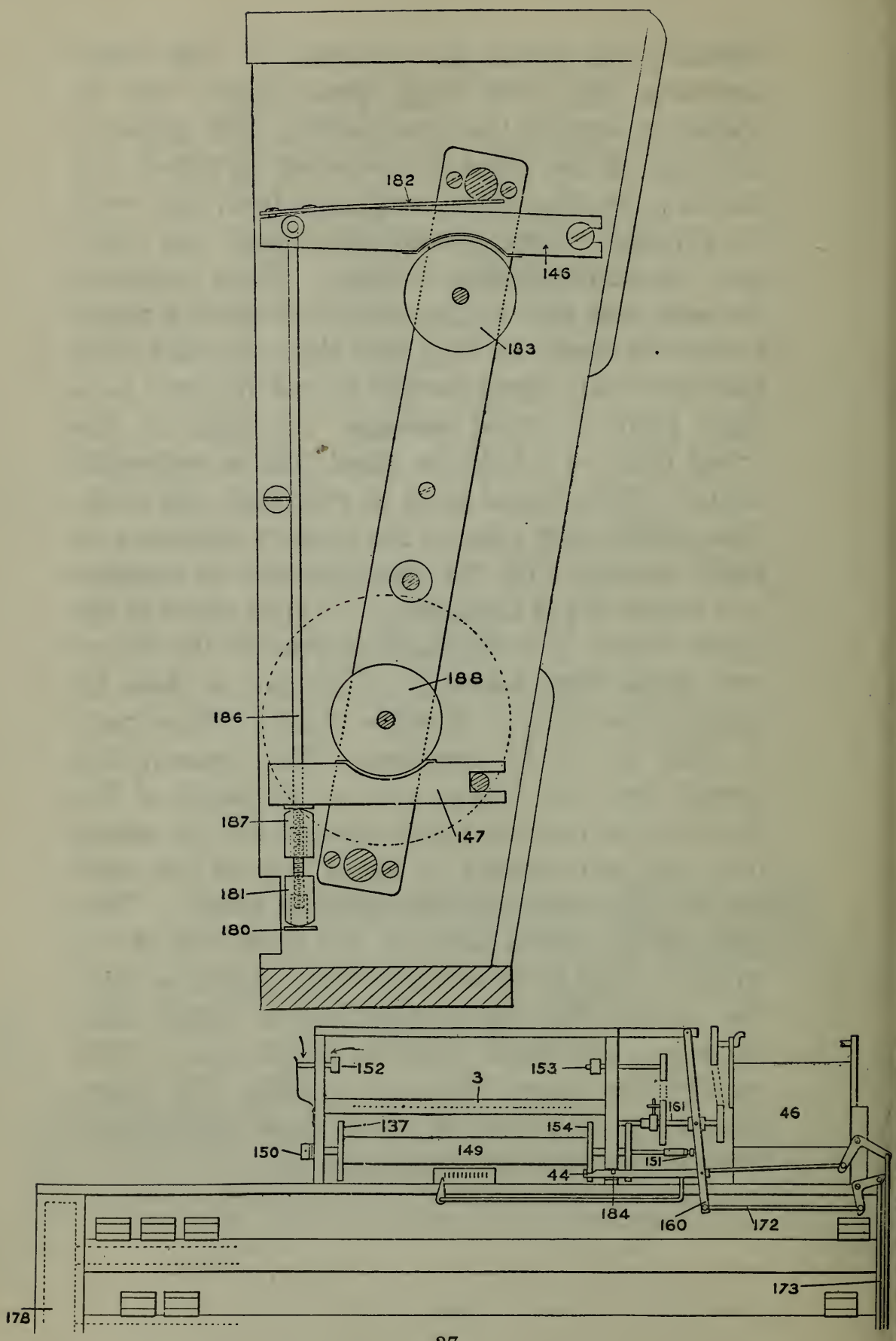
chests (5) to reach the pouches (7), but when *necessary,* and *only* then, these chests can be opened by cutting the lower sealing cloth across at any part of the chest it is desired to enter, and carefully starting these, cut ends from the wood by slipping a knife blade underneath the cloth and (carefully) peeling it back. When replacing the seal, first glue a ½-inch strip of writing paper across the chest, let dry, and then glue the cloth back over all, being careful to *rub* it down to a tight joint to avoid leakage. An iron, or the broad blade of a knife or chisel that is *moderately* heated will be found good to rub down the cloth. The sealed lower edge of the bottom chest can be easily reached with the player action all together as it comes out of the piano. To open either of the upper chests, it is necessary to remove the one or two chests from below it. This can be done by slipping the tubes (8) off of the nipples of the chests (5) that are to be removed. Then remove the screws from the braces (301) at the back of the chests to be removed; next remove all the screws from the end support or board (302) at the right end of the chests, and take off that board. Then take off the round seals on the outer end of the wind-box (303) at the left end of the chests, to reach the screws that have their heads inside that wind-box, and which hold the chests to it. Then remove the screws that are holding the chests that are to be taken off. *Pull* those chests away from the box and do work required.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Cleaning of Chests—

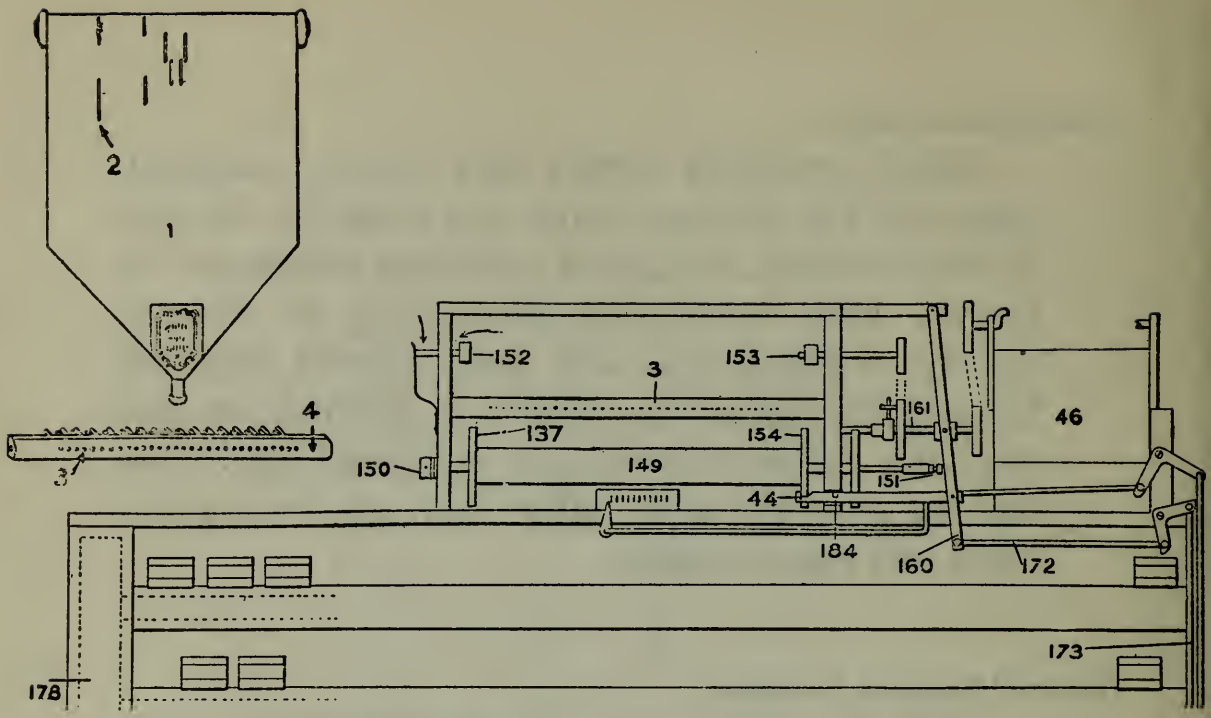
Before replacing chests and screws, carefully clean off the old glue from the holes in the end of the wind-box, and, after replacing chests and all screws, and being *sure* everything is screwed rightly to place, glue new leather seals over the holes in the end of the wind-box, putting the glue over the entire inner face of each seal, and shellacking over the seals after they are dry, as any leaks will cause trouble.

Oiling of Roll Box Bearings—

Roll Box Shafts and Bearings should be oiled once a month with clock oil or sewing machine oil at all the points marked with the arrows. *Never* use thick machine oil, vaseline or olive or vegetable oil. They will gum and stick. Keep oil away from the brakes (146, 147) and all parts of the motor. Once a year or so, the old oil should be cleaned away by putting kerosene at the oiling places instead of oil, running the parts well and wiping away the oil and dirt as it runs out. When fully clean and well wiped off, oil in the usual manner.

Adjusting Screws of Music Spool—

Music Spool (149) should have the adjusting screws (150, 151) at ends set so that the spool will give a *very* slight motion lengthwise when so moved by the hand. Too much motion will let music run sidewise. Too little play might slow its running. After setting its position by the right screw (151), turn left screw (150) just snug to spool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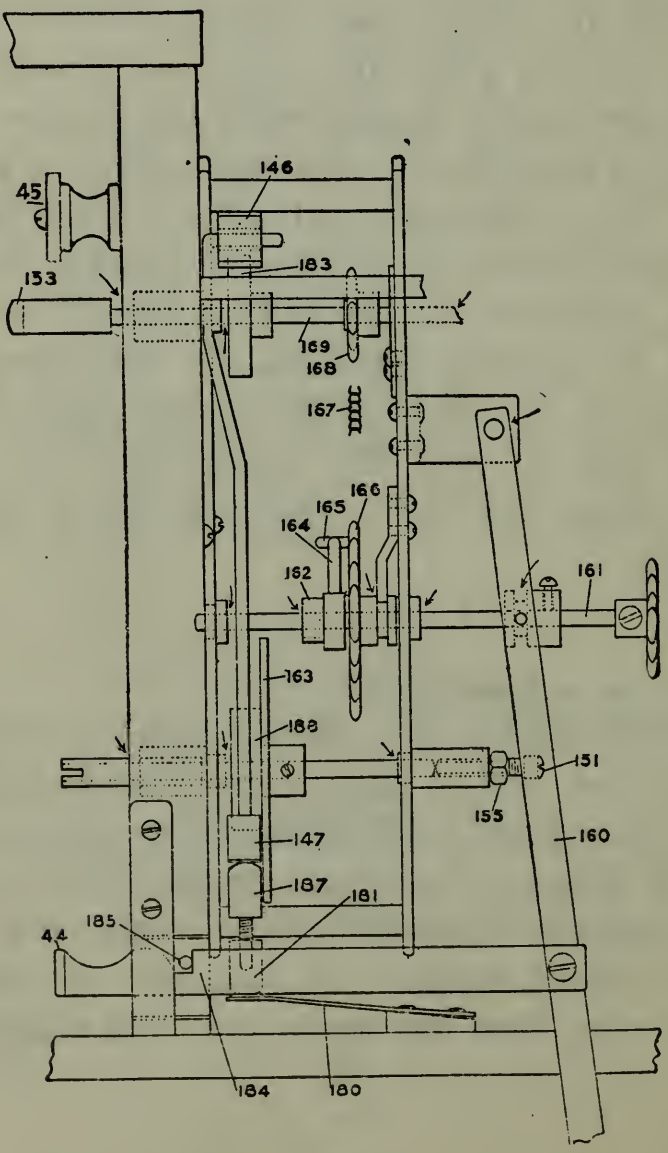
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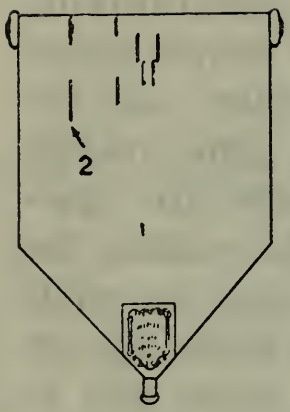
shaft and then turn screw (150) backward one-eighth of a turn to give freedom.

Music spool (149) is set to its lengthwise position by loosening the left screw (150), throwing handle (44) to the left. Place a *correct* music roll in position on the upper spindles (152, 153) and draw down the paper until some middle perforations (2) come over the tracker bar apertures (3). Throw handle (44) to right, making the holes exactly center by use of regulator (45), while paper is held tight stretched by the hand, but not attached to the spool. With the paper still so stretched in front of the spool (149), turn the right hand screw (151) in or out until the right edge of paper is 1/32 inch to left of right end (154) of spool (149), while the spool is shoved to the right against the right-hand screw (151). Set the binder (155) on screw (151) and then turn up left screw (150) just snug to the spool shaft and then turn back one-eighth of a turn. (Always examine this binder (155) first thing. If loose, it may have caused trouble.) Move the cylinder lengthwise with your hand to see that it is just free and whirl it for the same reason. With the curved-shaped one-piece roll frames, (see page 44), there is a single solid shaft through the music spool (149). This single shaft is held to its lengthwise position by a set collar and the large gear at its right end, the position of the spool (149) on the shaft being set by the set screw in its *right* hub.

Now hook the music sheet (1) to the spool (149) and play at moderate speed and power to see that the adjustment is correct. Music spool (149) in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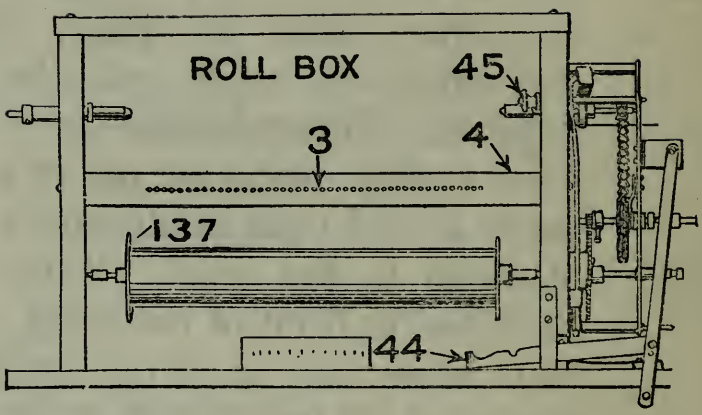
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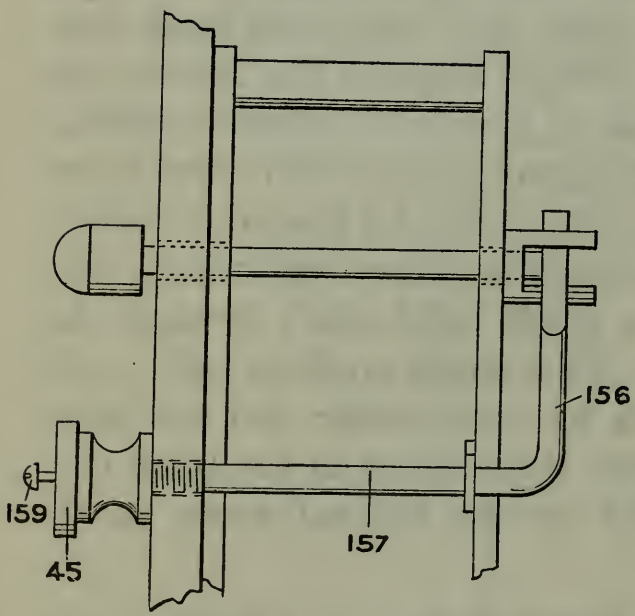
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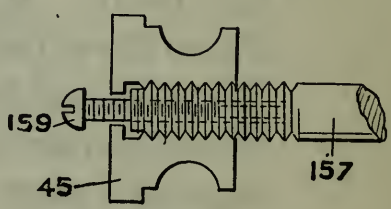
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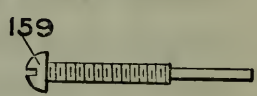
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many "Manualos," has an adjustable left head (137). This *adjustable* spool adjusts from 11¼ inches to 11⅜ inches, between heads. In some players, this left head has been locked by a set screw. When so locked, the distance between flanges should be $11\frac{11}{32}$ inches.

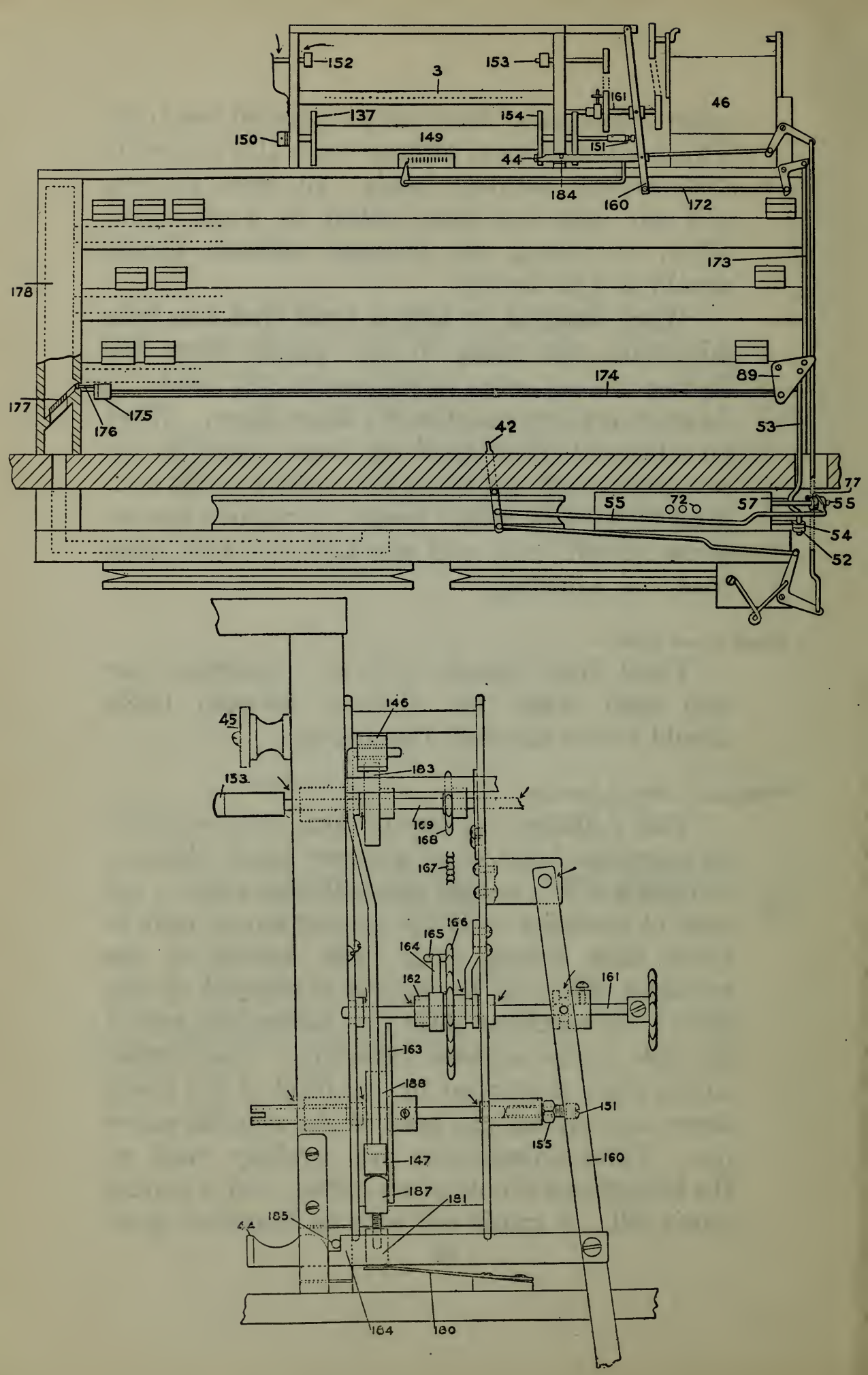
When desiring to lock a head that has been adjustable, set heads to $11\frac{11}{32}$ inches apart and tighten the set screw in hub of the left head. If no screw is there, insert an 8 x 32 set screw. When an adjustable-head spool has been locked by the set screw at left head, and it is desired to have the head adjustable, either loosen or remove the set screw of left hub, and see that the hub turns freely for adjusting.

Fixed Spool Head—

Fixed Head Spools with no adjustment are also used—when the distance between heads should be the standard $11\frac{11}{32}$ inches.

Working of Roll Adjuster—

Roll Adjuster (45) has its arm (156) regulated to move the holes (2) of a *correct* music sheet (1) to right and left so that they will just come to the edge of the holes (3) in the tracker bar (4) next to those they belong with. The motion of the regulator arm (156) to the left is stopped by the end of the regulator shaft (157) hitting the end of the hole inside adjuster screw (45). The motion to the right is stopped by the head of the check screw (159) hitting the head of the adjuster screw (45). These adjustments are carefully made at the factory and should prove correct with a perfect music roll. A music roll with an imperfect spool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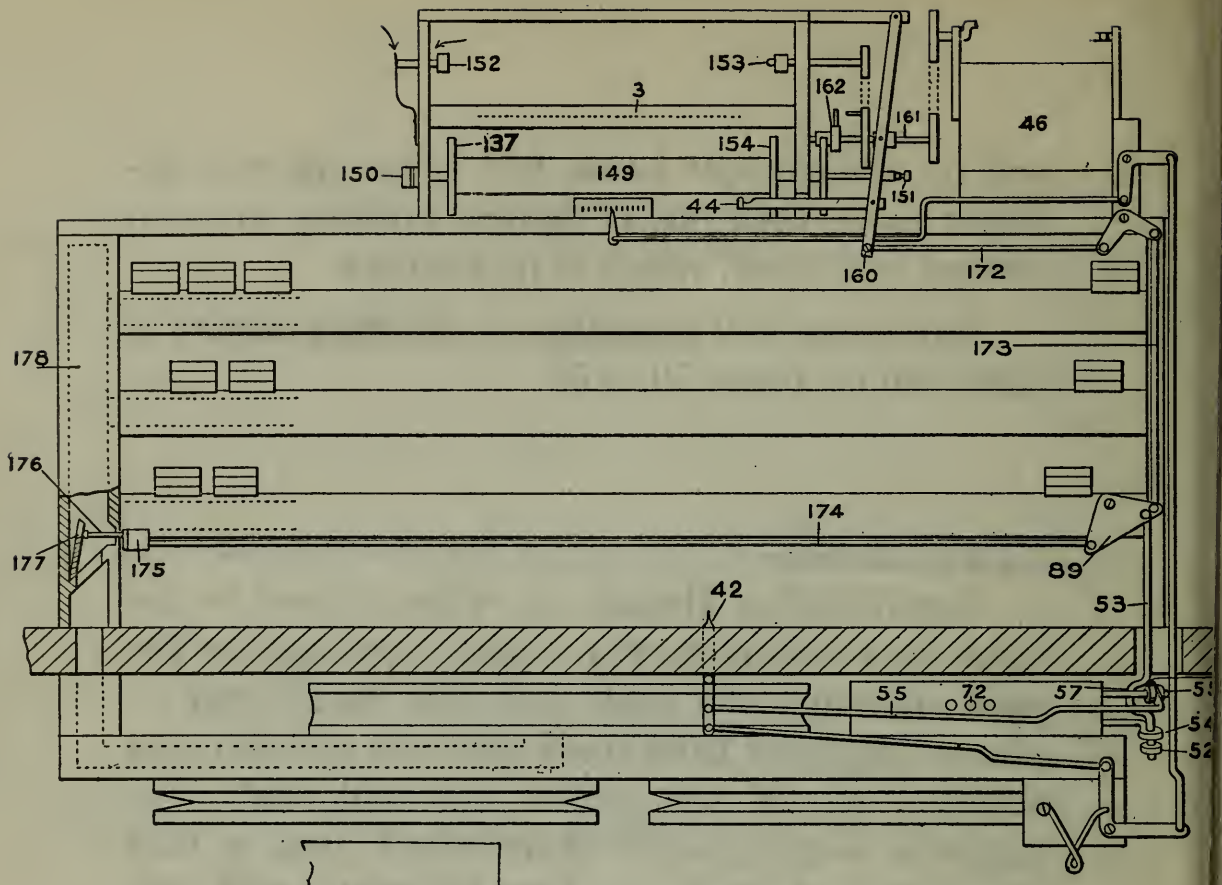
end or wrongly cut holes, will cause the roll adjuster to be used out of central position so as to correct that error, which is its purpose.

Automatic roll regulator or tracking device is described on pages 50 to 53.

Working of Reroll Device—

Reroll Shifter Handle (44) when shoved to the right for rerolling moves vertical arm (160) to the right, drawing the shaft (161) and small gear or pinion (162) away from spool gear (163) and bringing the pin (164) of the pinion (162) and shaft (161) opposite to pin (165) of chain wheel (166), so that the turning of shaft (161) from the motor will then cause the wheel (166) and chain (167) to turn wheel (168) and spindle (169) to rewind the music roll which is engaged with the clutch (153) of the spindle (169).

At the same time, the arm (160) has moved connections (172, 173, 89, 53, 54) to open the reroll valve (78) of tempo governor box (43), (see drawings, pages 15-16), thus serving the direct full tension of bellows air to the motor (46) for high-speed rerolling. The arm (160) has also moved connections (172, 173, 89, 174, 175), to draw the push rod (176) away from cut-out valve (177) inside the lower part of air trunk (178) at left of action, thus allowing that valve to drop closed and cut off all bellows air from the player action, preventing any notes sounding when rewinding the music roll. If the reroll shifter is *doing its work,* do not change the connections.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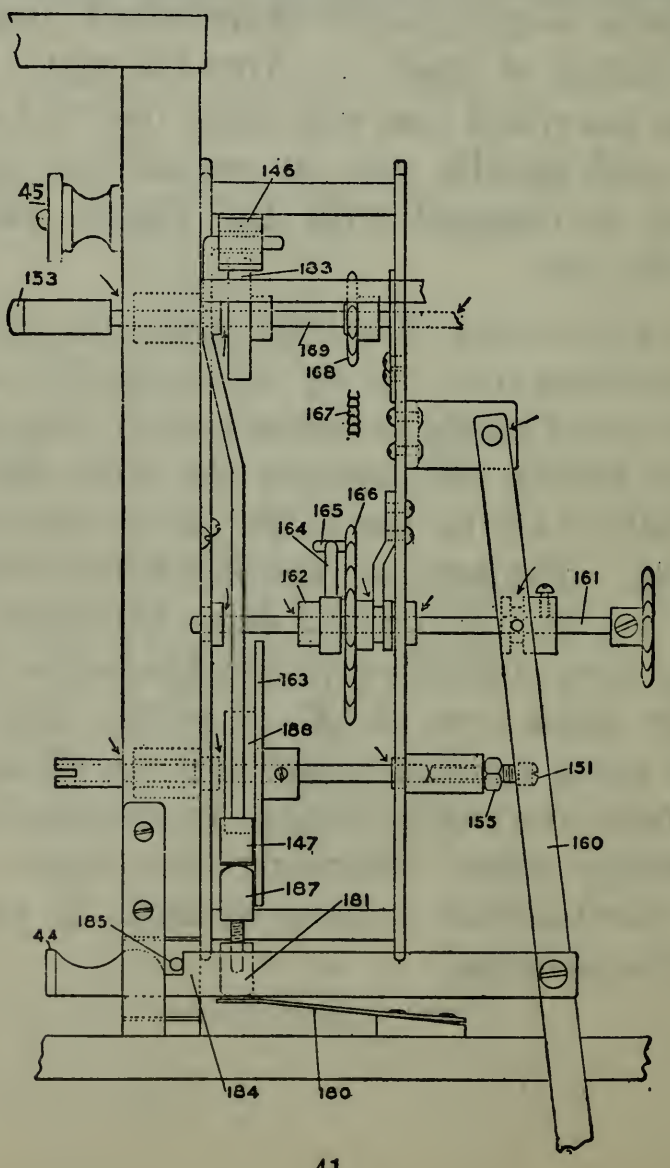
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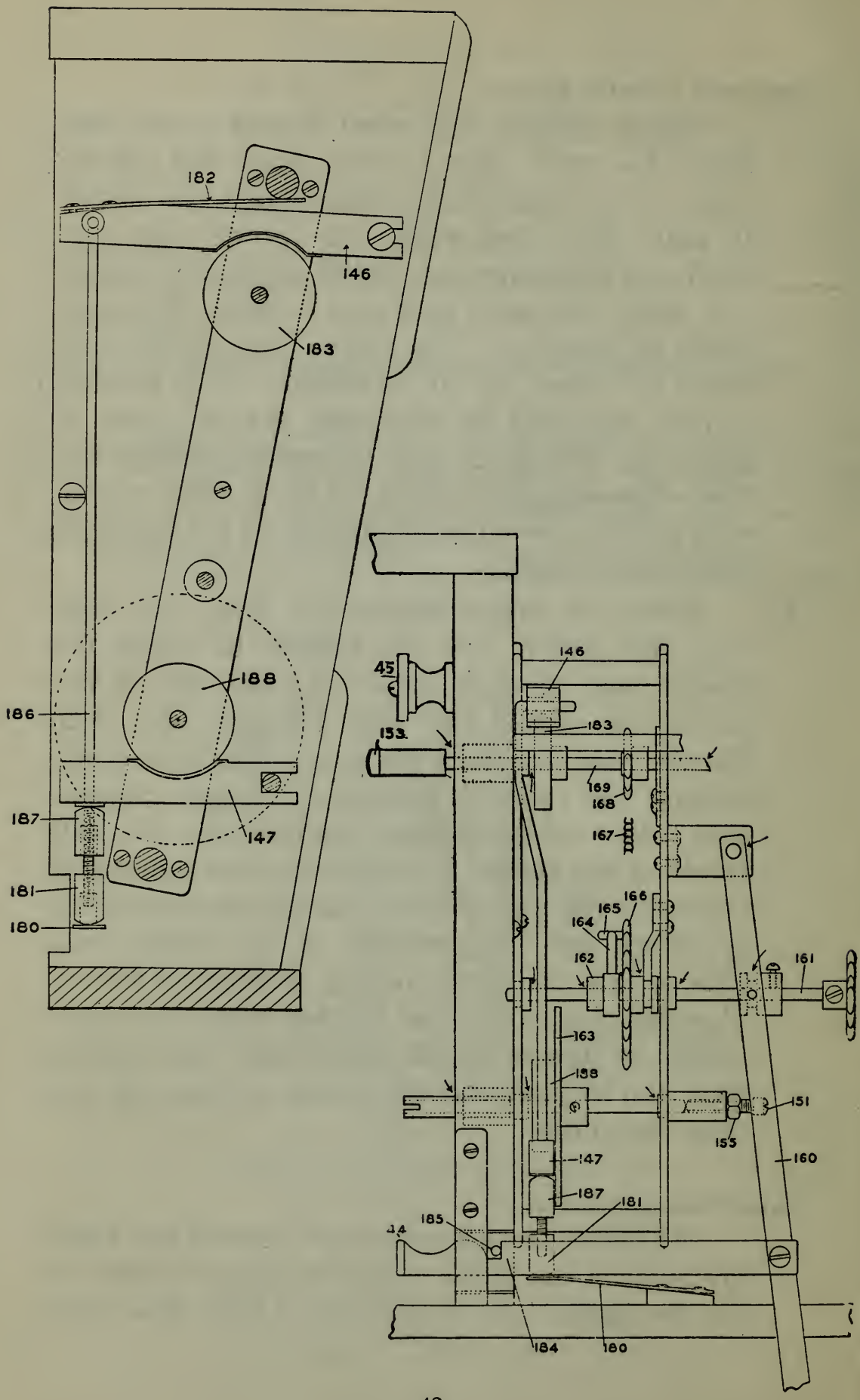
Regulating of Shifter Pinion—

Shifter Handle (44), when moved to the left, allows the reroll valve to close, opens the cut-out valve (177) to connect the bellows air to the action to make the notes work, and throws arm (160), shaft (161) and pinion (162) to left, so that the pinion (162) works the spool gear (163) to move the music sheet for playing. The pinion (162) should now stand with gear (163) at its middle. This position can be regulated by loosening the set screw of gear (163), sliding the gear to correct position and then tightening the screw. (N. B.—Be careful with all set screws that they bind on the flattened side of their shaft.)

When the shifter handle (44), arm (160), shaft (161) and pinion (162) are thrown to about the middle part of their throw, the left end of the pinion (162) should just clear the gear (163) while the pin (164) just clears pin (165). This is to avoid locking the forward and reroll motions against each other when shifting, and allows the half throw of the shifter to permit the free moving of the music roll and spool by hand when testing roll adjusting, etc. Adjustment of the pinion and pins to this clearance position is done by setting of pinion (162) so its collar touches wheel (166) when shifter is thrown to the right, and then setting gear (163) to just clear the pinion as pins (164, 165) clear each other.

Correct Setting of Screws—

Whenever any set screws are pointed and there are holes in the shafts to receive them, be sure to set the screws into those holes if they have been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loosened, as these holes give the correct position of the parts.

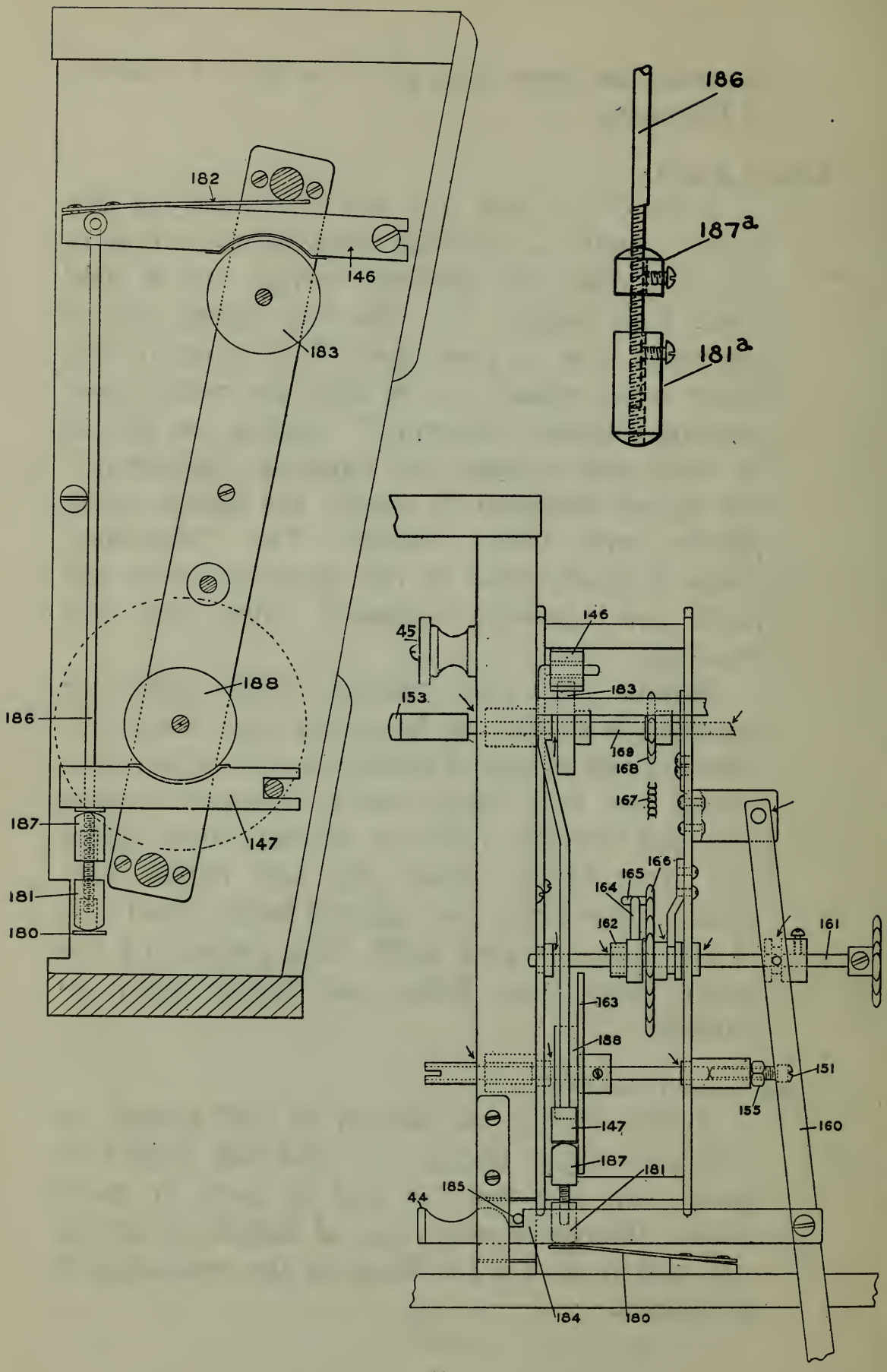
Control of Brakes—

Brakes (146) and (147) are controlled by the shifter handle (44) so that when handle (44) is to left and down for playing, spring (180) is held down from button (181), allowing spring (182) of top brake (146) to press down that brake on the upper brake wheel (183) to keep the music sheet running without "shivering." Spring (182) should be only stiff enough for stopping "shivering," but is not intended to steady the motor, as in players with faulty motors. The "Manualo" motor is constructed to run smoothly when roll parts are correctly adjusted, oiled and free running.

Handle (44), when shifted to the right for rerolling, is thrown up by spring (180), notch (184) allowing rise of top of handle (44) above pin (185), spring (180) thus being free to press up button (181) and vertical rod (186) raising upper brake (146) from brake wheel (183), and button (187) raising lower brake (147) against brake wheel (188) of the take-up spool shaft, thus preventing the music sheet from flying out during rapid rewinding.

Condition of Lower Spring—

Lower Spring (180) should be stiff enough to overcome upper spring (182) and the weight of handle (44), and rod (186) and its parts, to make certain the rise of notch (184) of handle (44) on pin (185) and to give a fair drag on the rewinding of the paper.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Adjusting Upper Brake Button—

Adjust Brake Button (187) when handle (44) is to the left and down, and spring (180) not pressing button (181), turning up button (181) if spring touches it. Hold lower brake (147) up by its front, and so that it is pressing against lower brake wheel (188), and screw upper button (187) up or down on rod (186) so that upper brake (146) is a scant 1/16 inch above its wheel (183).

Adjusting Lower Brake Button—

Throw shift handle (44) to right with pin (185) in notch (184), and then regulate lower button (181) down until bottom of notch (184) of handle (44) is surely clear of pin (185), when lower brake (147) should then be snug against lower brake wheel (188) from upward pressure of spring (180). Should regulating of bottom button (181) fail to allow both brakes to work alternately as the handle (44) is shifted, it is probable you have set button (181) too low.

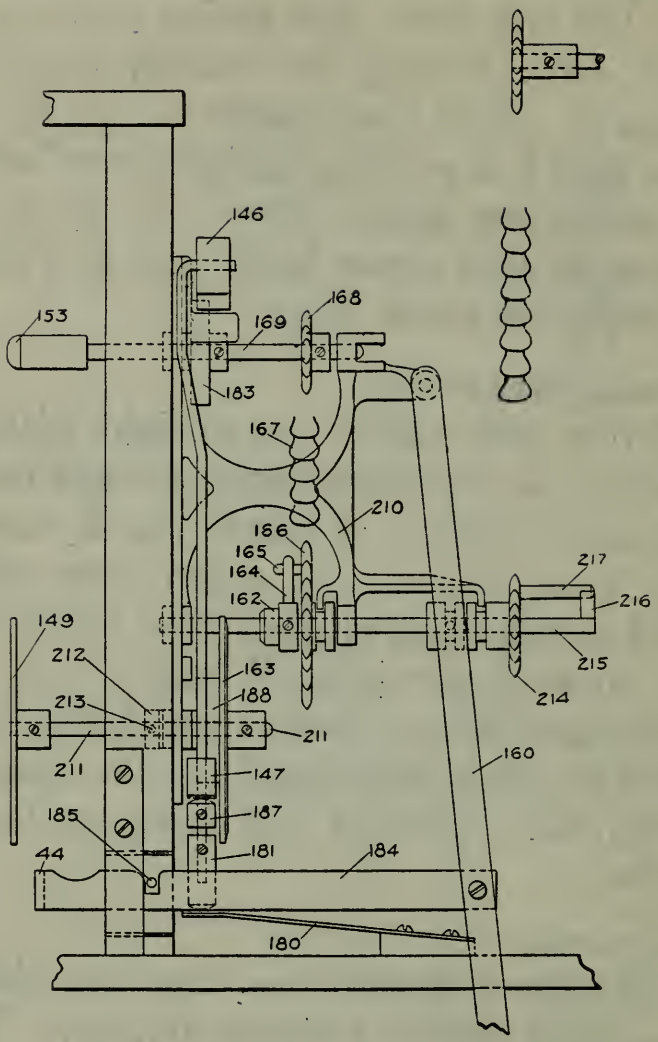
Metal Brake Buttons—

Buttons of Metal (181a, 187a) are also used in place of the wooden buttons (181, 187). The metal buttons have set screws in front of each, and the rod (186) is flattened on its front for this screw to be set to after the buttons are screwed up or down to correct positions.

Brake (146) is sometimes used without a spring, having had weighting loads set into its inner face.

Keep Oil Off Brakes—

Brakes (146, 147) having leather facing, should have no oil on them. If oily or gummy enough to cause dragging of the motor, they should be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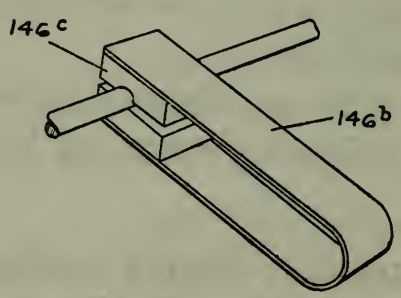
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146b

cleaned off dry, and new facing put on if needed. Those having bare wood in their curved faces should be wiped out.

Weighted Upper Brakes need no attention except to wipe out clean on their curved faces.

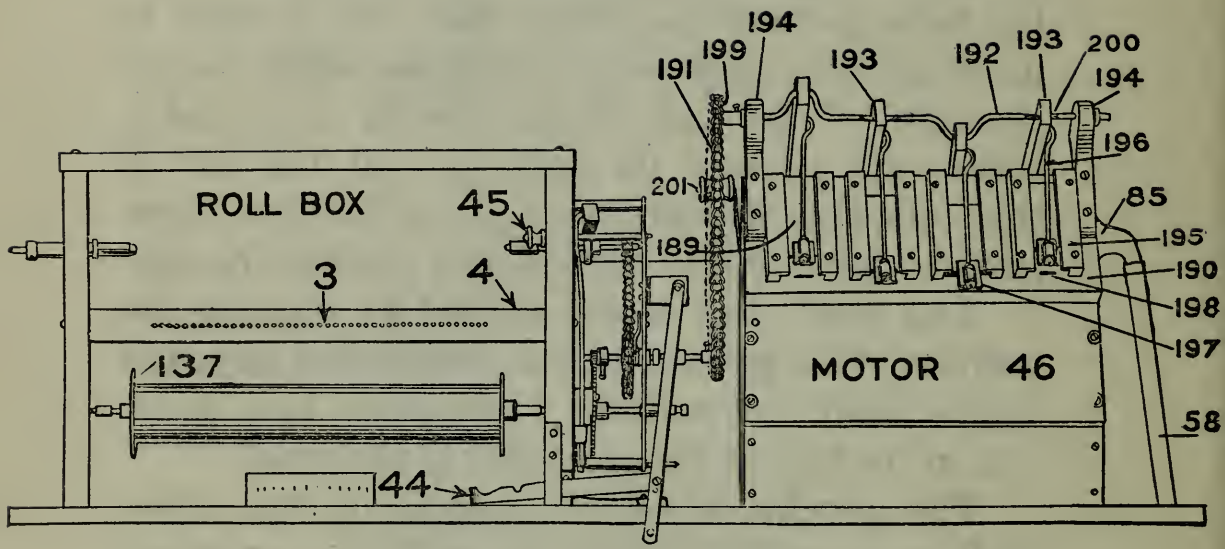
Curved form of Roll Frame (210) of single casting has most of its main spindles, etc., the same as with the straight line riveted frame, as shown by the similar numbers, the principal changes being the adjustment of the shaft (211) of the take-up-spool (149) which shaft (211) is held to its lengthwise position by the brake-wheel (188) at the right of the hub of the casting (210), and a collar (212) screwed on shaft (211) at the left of that hub, fiber washers being placed between these parts to take up lost motion and prevent friction.

This shaft (211) is not shifted to regulate the position of the spool (149), but the spool is adjusted on the shaft (211) and set to its place by a screw (213) in the hub at the right end of the spool.

The sprocket-wheel (214) is loose on the drive-shaft (215) a clutch (216) on the shaft (215) engaging a pin (217) on the sprocket-wheel (214) so that the wheel always drives the shaft (215).

Compression Brakes—

A Compression or "Pinching" Brake (146b) is used on some "Manualos," these having wooden jaws (146c) which have been oil-soaked to prevent squeaking, and are to be slightly moistened with clock oil or sewing machine oil if they ever squeak. These brakes stay constantly gripping, having no throw-off connections or any other parts to be regulated. Do not alter them.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MOTOR

Warning—

Motor (46) of the "Manualo" is very accurately designed and carefully made and should not be touched until it is first known that all the roll box shafts, gears, chains, brakes, etc., are in perfect order and moving smoothly. That known, test and regulate motor as follows, and *do not vary from these standard instructions.*

Use No Oil on Motor—

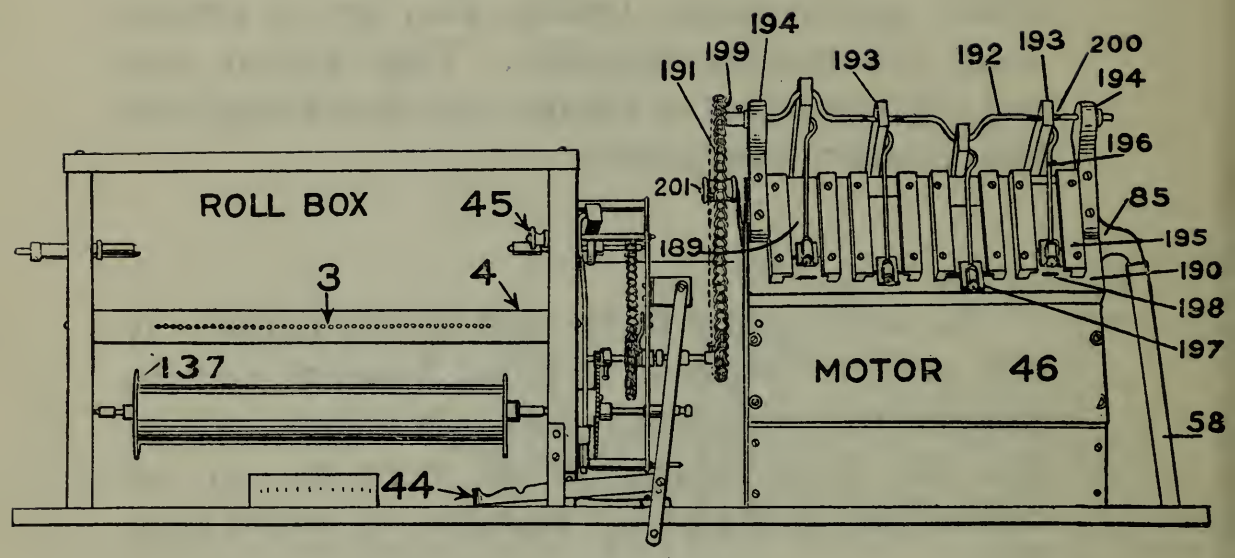
No oil or grease to be used on the motor. It will spoil it. Squeaks of felted bearings may be stopped with dry black lead (plumbago) rubbed into the cloth linings, but let none get on the valves (189) or the bed or seat (190) on which they slide.

Cleaning of Motor Valves—

Valves (189) and the bed or seat (190) on which they run may be wiped off with a *dry* cloth to remove the dust, but must *never* have any oil or grease even touch them, as it will make them gum and stick, and *nothing* should ever be put on them, even black lead, as that is apt to gum and drag the valves in damp weather.

Testing of Motor—

Test Motor by removing chain (191) and hose (58), and turn the shaft (192) by hand to find any stiffness, and see that pitmen (193) are free on shaft (192) at all four quarters as you turn the shaft. Also see that shaft (192) is easy on its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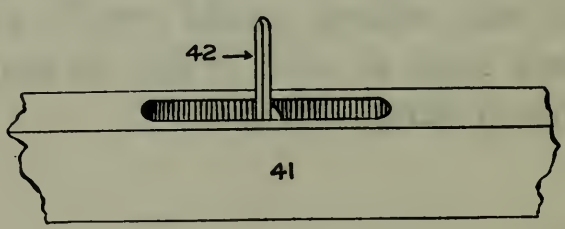
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end bearings (194) and has a little freedom lengthwise. Also see that there is no cramping of the pneumatics, as by dirt in their hinges, or too close coming together of their boards.

Replace hose (58) but leave the chain (191) off, have a music sheet over the tracker bar (4) and move tempo handle (42) to point 20 or 30 on the indicator plate, then pump and watch to see whether motor runs smoothly. Any unsteady motion should now show at *its quarter* of the shaft revolution, and thus point out where trouble is to be found.

Motion of Motor Valves—

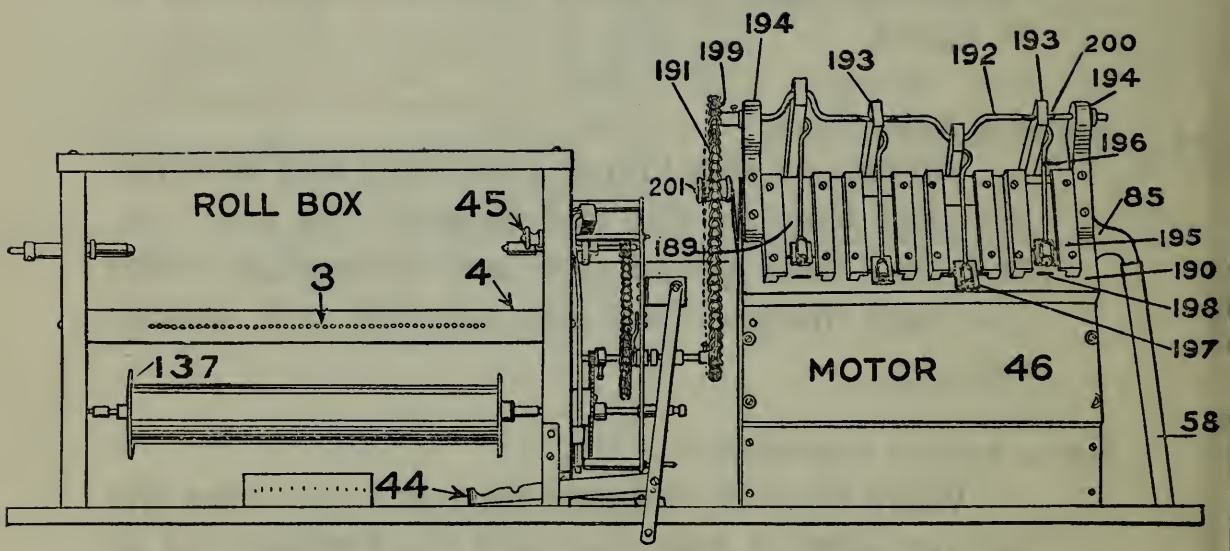
Valves (189) should move smoothly and steadily. See that they lie flat and close to the seat (190) and that their guides (195) and connecting wires (196) and flanges (197) are all free, yet steady running.

How to Correct Valve Motion—

Valve Motion is shown by a line (198) near the bottom edge of seat (190) and the bottom end of each valve (189) must exactly match its line (198) as it reaches the bottom of its movement when *moved by the pumping*. If any valve (189) does not match the line, correct by screwing the nuts up or down on the wire (196) of that valve, leaving the nuts just free enough against flange (197) that the flange can turn on the wire to avoid twisting the valve.

Motor Valves Without Leather Nuts—

Motor Valves that do not have these leather nuts are regulated to the marks by a slight bending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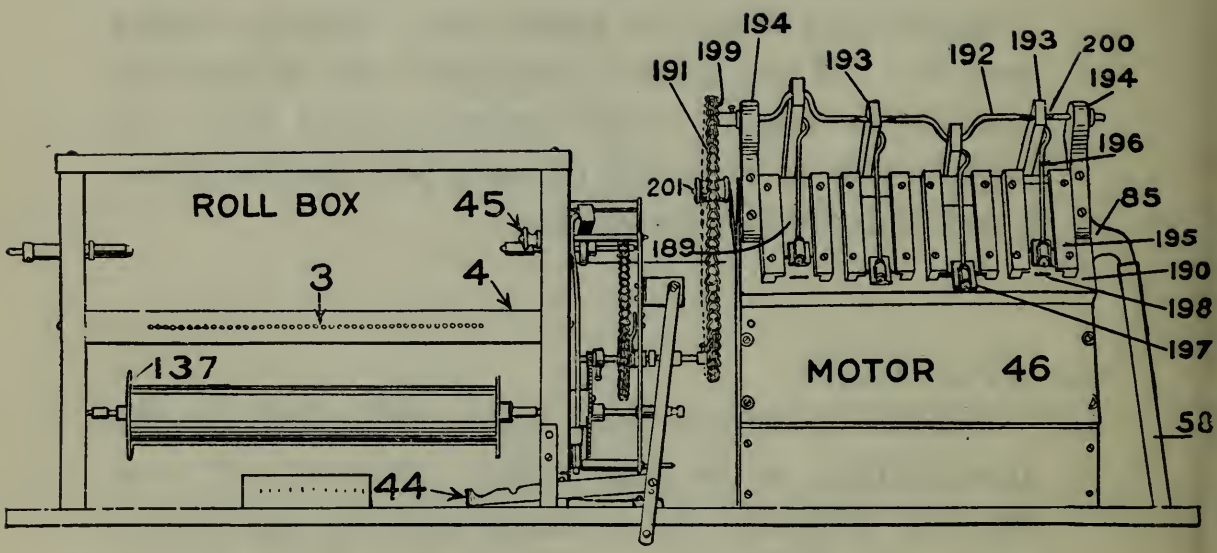
of the valve wires when necessary. These marks or lines (198) show, and may be proved, by the factory test as follows: Fine-test valve setting of motor with chain off, hose on, music roll in place, reroll shifter handle (44) to right, pumping hard, and with left hand, hold sprocket wheel (199) from turning. Now let wheel (199) turn very slowly as you hold it and pump, and watch the pneumatic which is going to the rear, and stop the wheel as the air snaps in the cloth folds of that pneumatic, at which time the pitman (193) should be on a straight line with its crank (200), that is "dead center." If not correct, regulate nuts of the wire (196) until snap of cloth comes at right time. A slight error in this will cause a jerk as the pneumatic commences its work.

How to Prove Leaks—

Leaks in Motor may be in the cloth of the pneumatics, or because valves (189) or seat (190) are not perfectly flat. Leaks may be proved by removing chain (191) and hose (58) from motor, placing flat of your right hand over hole of flange (85) where the hose was, and turning the shaft *backward* by your left hand on the wheel (199), keeping on turning until the motion of the wheel becomes very hard if the motor is tight. A leak of any one valve or pneumatic will show as its particular pitman (193) is moving backward, when the wheel (199) will turn more easily than at other parts of its revolution. A general leaky condition from all the pneumatics being worn, or an old motor, or all the valves or seat out of con-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dition, will show by the wheel (199) turning too easily.

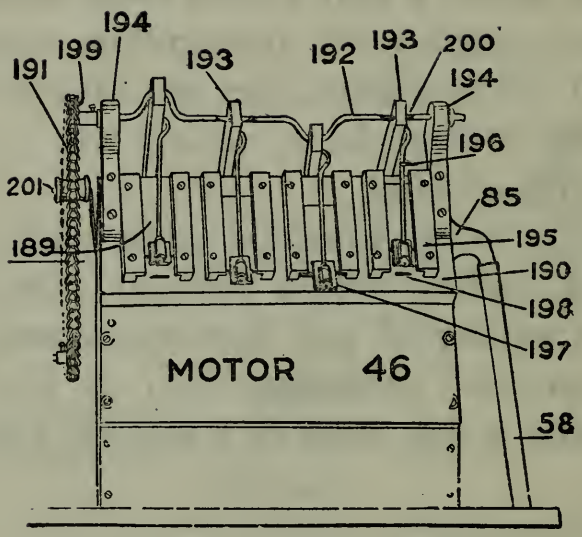
How to Repair Leaky Pneumatics—

Leaky pneumatics, if only worn at folds, can be repaired by gumming a piece of very thin leather (like the pouches) over those worn corners, using medium thin French varnish, or liquid glue if French varnish is not to be had. Put very little glue or varnish on, and preferably on the rubber cloth to avoid a stiff corner from soaked leather. Old and much-worn pneumatics should be re-covered. The pneumatics are attached to motor block by leather joint, which will allow forcing apart with a chisel.

Leaky valves must be made perfectly flat on the face, testing with a straight edge (or visiting card), scraping off any high spots, and smoothing down on "00" sandpaper laid on the face of an iron plane, a flat block or a looking glass.

Leakage Tests for Seats—

Leaky Seat (190) must be tested by straight edge, high spots scraped down, and the whole surface smoothed with "00" sandpaper folded around a *perfectly* flat block. In shop work, this operation is best done with an iron block with perfectly flat top, such as machinists use. Sand-paper can be glued, or shellacked and hot ironed to such a block. Better yet, a small printing press "platen" may be used, which has "bail" clamps for holding the paper. With such a block your valves, motor seat, or like work, is turned face down on sandpaper, and shoved one way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only, from you, selecting the high parts of your work, for the line of direction to shove. After sanding valves or seats, clean off with cloth and rub with clean *back* of sandpaper to remove all dust. One speck of grit left on will spoil your job.

How to Set Idler—

Idler (201) should be set tight enough to hold the *idle* rear part of the chain (191) outward and just taut. Overtightness will slow motor or make it "hitchy." Idler should always throw rear line of chain (191) outward and backward away from other part of chain. Never place an idler to the naturally tight "working" half of the chain.

Correct Position of Chain—

Chain (191) should stand straight or nearly straight up and down as to right and left, when the music roll is playing, letting the slant of the chain occur, when rerolling, when high power of the motor will better overcome this extra work.

The rolling apparatus with curved frame is arranged to have the chain from the motor run straight up and down at all times.

FIGURE A

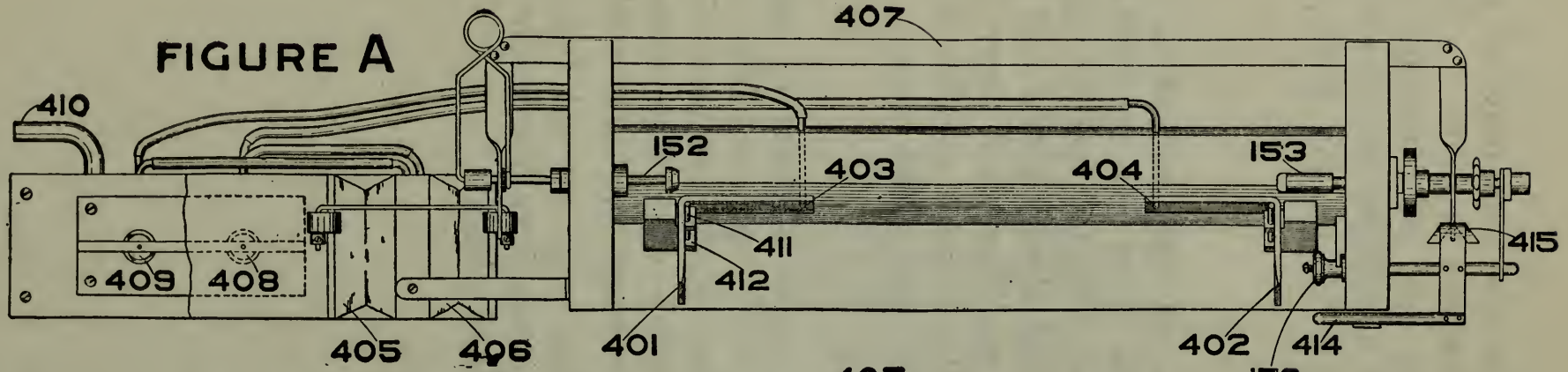
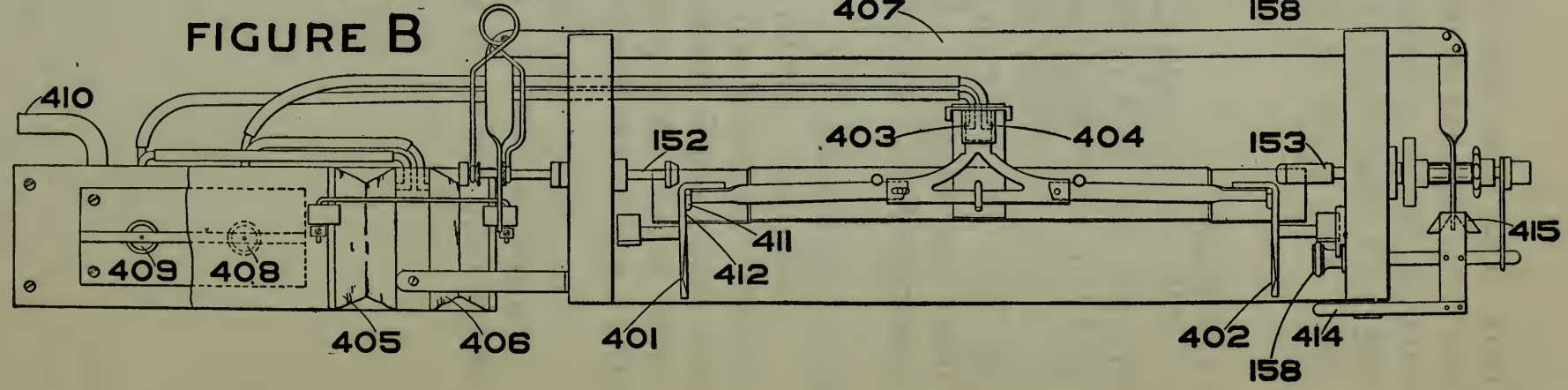


FIGURE B



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AUTOMATIC ROLL REGULATOR OR TRACKING DEVICE

Simple Style and Floating Triangle Style—

Both simple style and compound lever "Floating Triangle" style are in use in the "Manualos." The simple lever is shown by a view from above in Figure A. The compound or "Floating Triangle" style is shown in Figure B.

In both styles, there are two fingers (401, 402) at the two edges of the music sheet. Each of these fingers controls a hole at its rear (403, 404), each hole leading to a corresponding controlling pneumatic (405, 406).

Work of Controlling Pneumatics—

These pneumatics (405, 406) are connected by a yoke (407) to the spindles of clutches (152, 153). Whenever the music sheet moves too far to the *left*, the finger (401) is shoved to the left and opens hole (403), which causes the pneumatic (405) to push the yoke (407) and the spindles (152, 153) to the right to correct the position of the music sheet. Whenever the music sheet moves too far to the *right*, the finger (402) is shoved to the right and opens hole (404), which causes the pneumatic (406) to push the yoke (407) and the spindles (152, 153) to the left to correct the position of the sheet.

In some "Manualos" the holes (403, 404) connect to pouches and valves (409, 408), as in Figure B, these valves in turn controlling the pneumatics (405, 406), similar to the working of the striking pneumatics for the notes.

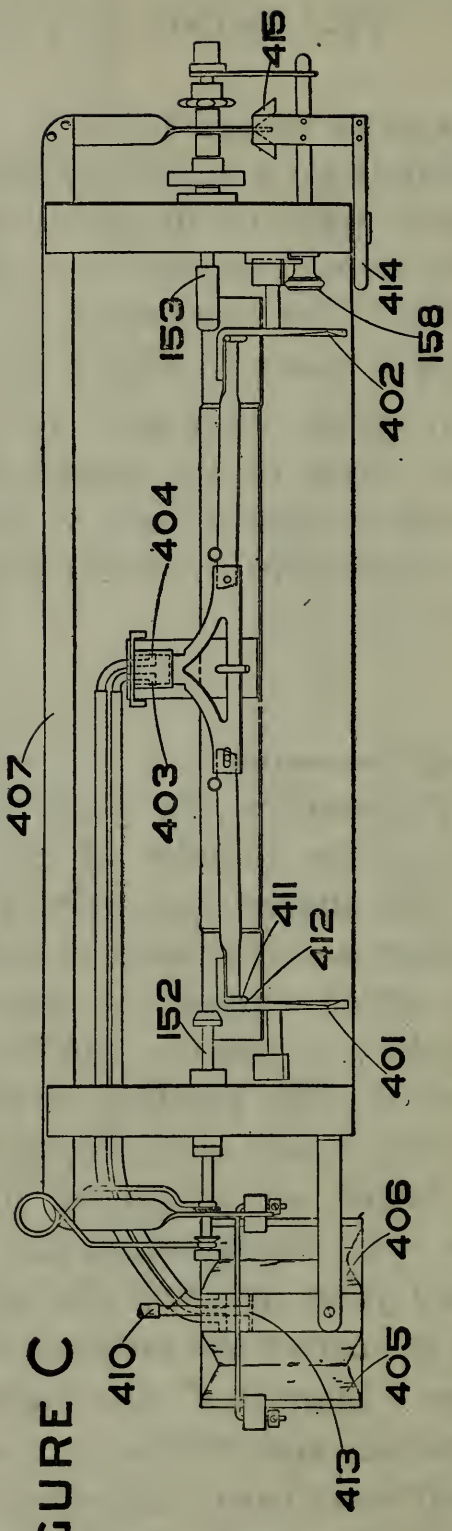


FIGURE C

In other "Manualos" (Figure C), the holes (403, 404) connect direct to the *opposite* pneumatics (406, 405), i. e., finger (401) and hole (403) connect to pneumatic (406), while finger (402) and hole (404) connect to pneumatic (405).

Working of Return Vent—

Each pneumatic (405, 406) has a return vent (413) in it connected to the player chest by a tube (410), both pneumatics (405, 406) thus having constant air suction from the bellows, and thus standing still by counter-balanced air pull.

Either hole (403) or (404), when opened, overcomes the vent in and relieves the air tension of *its* pneumatic (406, 405), so that the other pneumatic can then overcome it and do the work called for.

How to Test Automatic Tracker—

To test operation of these Automatic Roll Regulating Devices, use a roll of music that *you* have tested and found correct in a *perfect working "Manualo."* Now as you test, move the right finger (402) a trifle to the right and see that the paper starts to the left. Then move the left finger (401) a trifle to the left and see that the paper starts to the right. If they fail to work properly, proceed as follows:

Cleaning of Parts—

The various valves and vents are to be cleaned and regulated as for the note playing action.

The pins (411) and bearing holes (412) should be wiped clean with a *dry* cloth, but *no* oil of any kind ever used.

FIGURE A

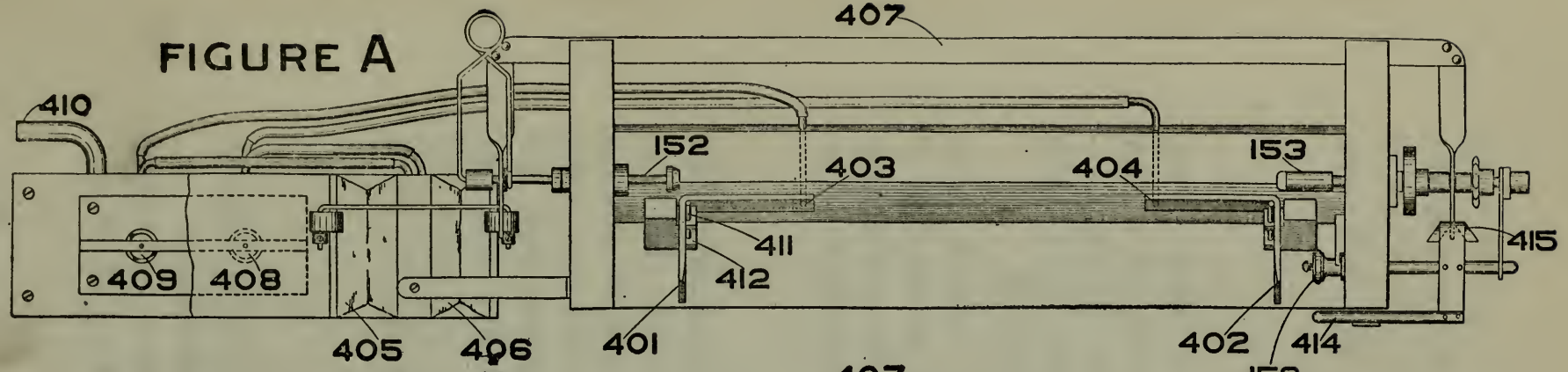


FIGURE B

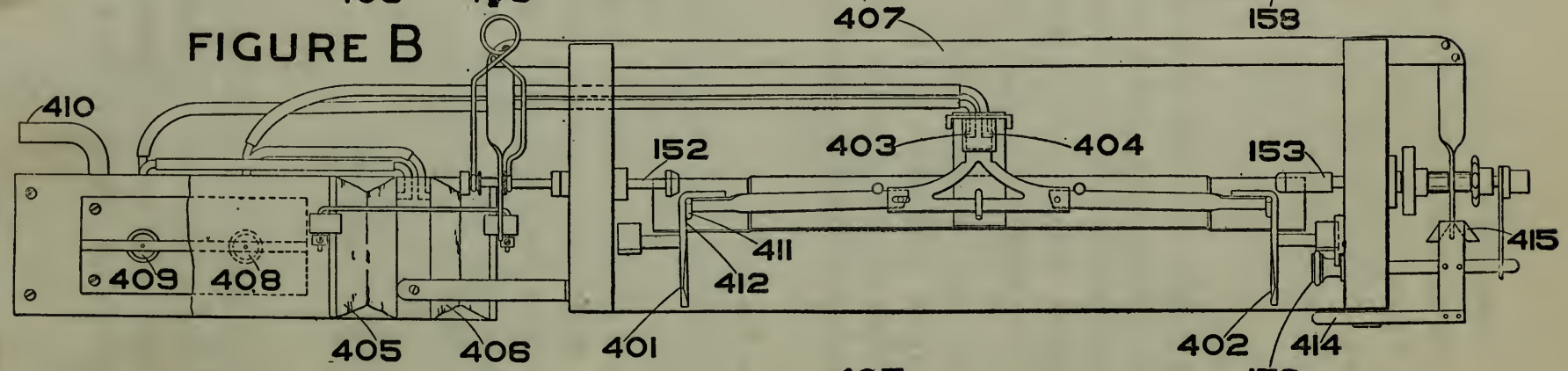
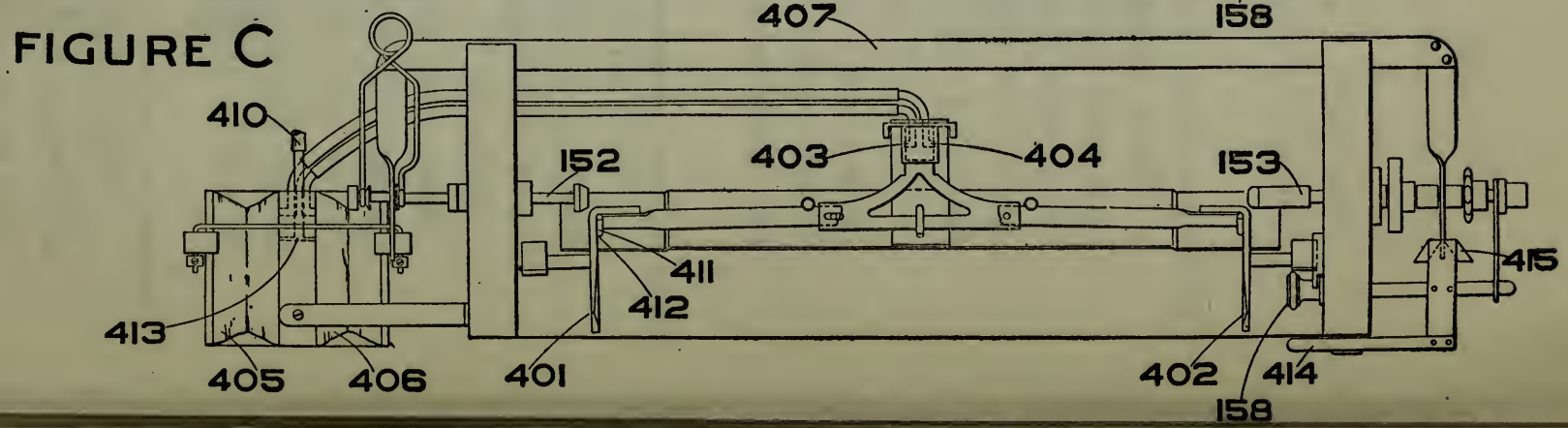


FIGURE C



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Never Alter Fingers—

The fingers (401, 402) have been carefully regulated at the factory by special gauges, and are purposely made so strong that they can not be changed by accident. They should *never* be altered from the standard setting. Any possible error of operation would be caused by dust or dirt on pins (411) and in bearings (412), or by dust in valves or vents, which cure as above directed.

Fingers of Simple Lever Style—

The simple lever style of Automatic Roll Regulator, Figure A, has the fingers adjusted so that when no music paper is between them, they will stand $11\frac{9}{32}$ inches apart, thus just clearing and guiding the proper width of standard music sheet, which is 11¼ inches, in ordinary weather or climate, but swells slightly. Should music become very wide by dampness, so that it is not well centered by the simple lever automatic regulator, place the roll in a warm, dry place until properly shrunken to 11¼-inch width. Do *not* bake or *iron* the paper, as it would be spoiled.

Fingers of Floating Triangle Style—

The Compound "Floating Triangle" Style of Automatic Roll Regulator, Figures B and C, has the fingers set closer together, and always lightly touching the edges of any width of music sheet and perfectly and constantly centering the sheet at all times.

Music Rolls Incorrectly Cut—

N. B.—Some music rolls have their holes cut sidewise of correct position. These *will not* play

FIGURE A

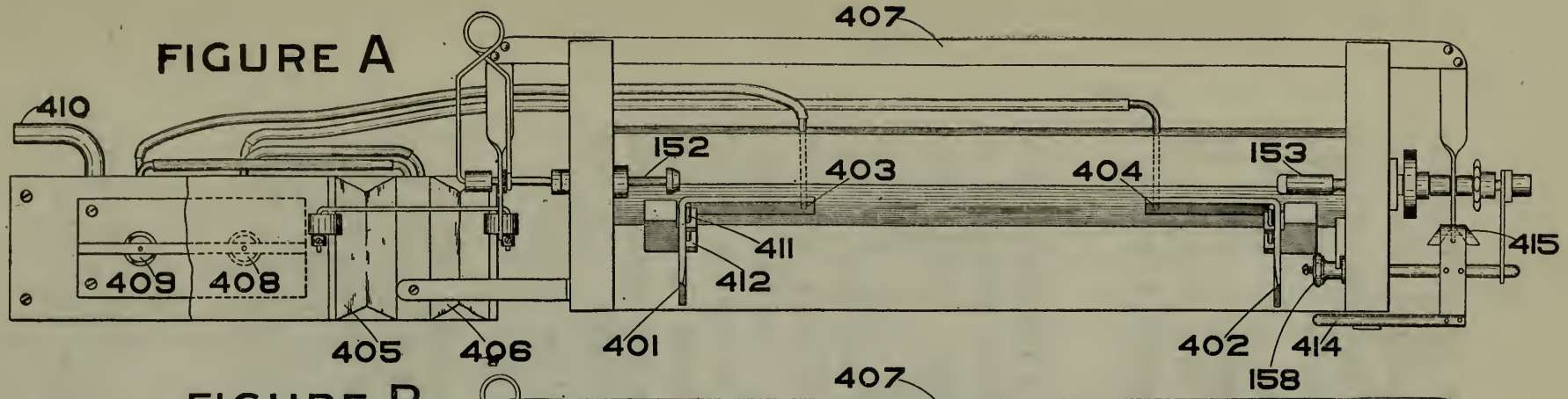


FIGURE B

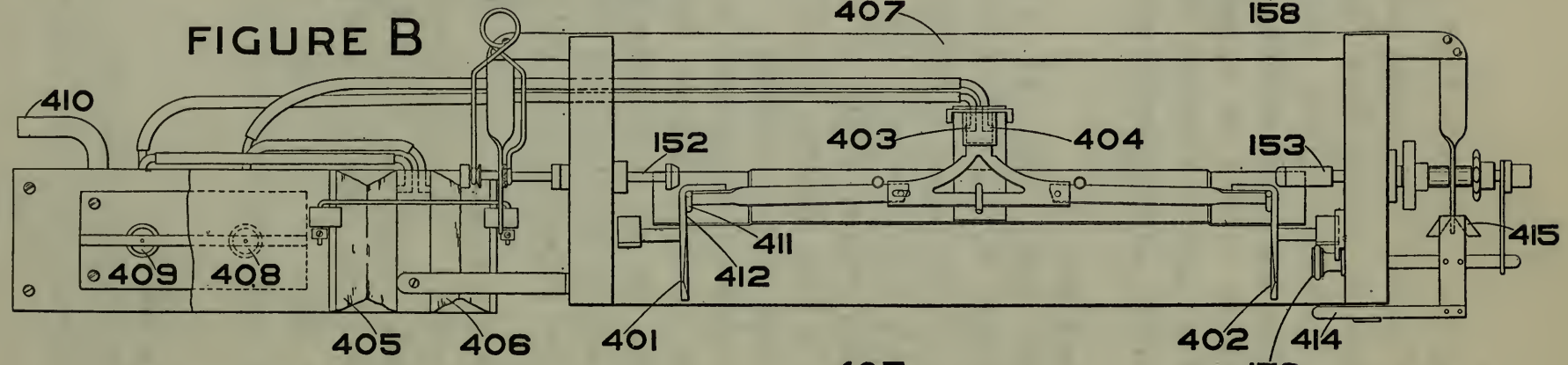
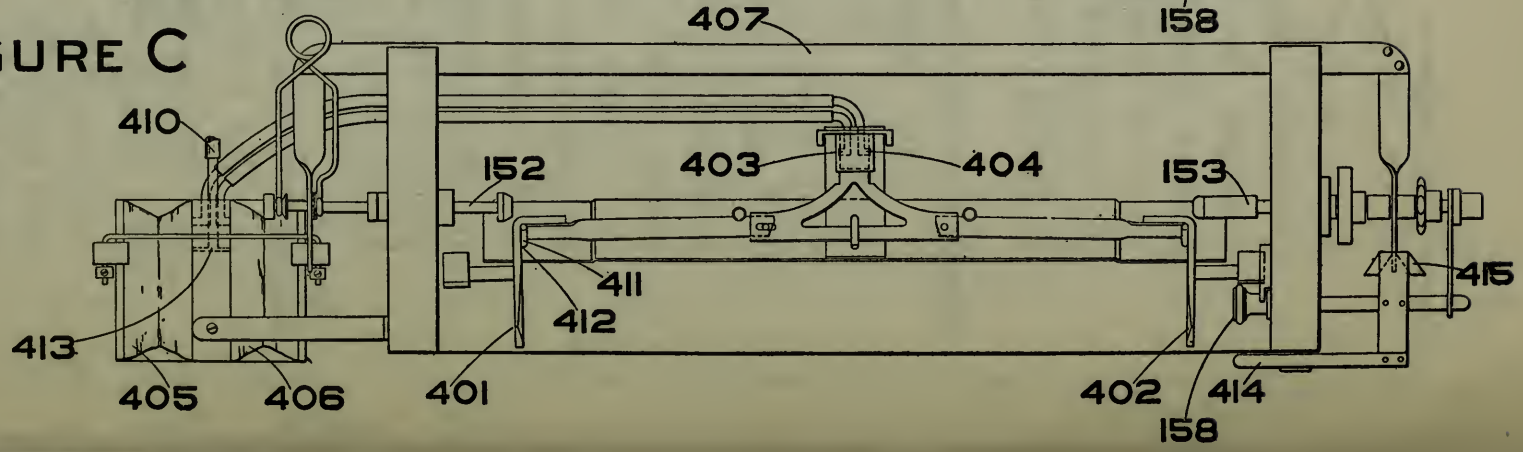


FIGURE C



properly with *any* automatic tracking device. If not too much in error, they can be used by throwing up the optional switch (414) and then turning the hand regulating button (158) until the holes of the music play correctly.

Music Sheets Running Sideways—

If a music sheet runs to one side and turns up on one flange or head of its spool during rewinding, from some cause like the wear of the bearing of spindle, etc., it may be corrected by taking out the screw at that end of the tracker bar towards which the paper crawls, and placing one or two pieces of card behind that end of the tracker bar to hold it forward. It will be necessary to file out the front of the hole in the wood for the screw that has been removed, so that it can be replaced after the bar has been brought forward.

Pneumatics—Placement—

Some of the "Manualo" Automatic Roll Regulator pneumatics have been placed on the top of the roll box, others at the left of the box. The operation is the same.

Hand Regulator Operation—

The Optional Hand Regulator Switch Handle (414), when thrown up, engages its prongs (415) on one end of the yoke (407), so that the turning of the roll regulator button (158) will move the sheet from right to left.

When the switch handle (414) is thrown down, the *automatic regulator* is free to work.

N. B.—When a roll has been played with the switch handle (414) down, it should be *left* down for rerolling.

In Baldwin Players having primary and secondary valves, the throw of the primary valves should be 1/32 inch. More than 1/32 inch throw lessens the quickness of its action and causes wind noises. Less than 1/32 inch throw lessens the power of the stroke. The return vent or bleed is connected to the primary valve. Its size is that of a No. 57 drill.

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